

April 1955 Volume 71 Number 4

PUBLIC HEALTH REPORTS

In this issue



U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service



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Health Assistance for Iraq

PUBLIC HEALTH REPORTS

Volume 71, Number 4

APRIL 1956

Published since 1878

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frontispiece

Training and organization are the primary concern of Iraq's health program. With American assistance Iraqis will get valuable training for the jobs that face them. See page 417.

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Public Health Reports, published since 1878 under authority of an act of Congress of April 29 of that year, is issued monthly by the Public Health Service pursuant to the following authority of law: United States Code, title 42, sections 241, 245, 247; title 44, section 220. The printing of this publication has been approved by the Director of the Bureau of the Budget, September 17, 1954.

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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ULTRAVIOLET STERILIZATION

in Microbiological Laboratories

A discussion of the germicidal protection offered by ultraviolet lamps installed in airlocks, at doorways, and on ceilings of microbiological laboratories and walk-in incubators.

By ARNOLD G. WEDUM, M.D., EVERETT HANEL, Jr., B.S., and G. BRIGGS PHILLIPS, B.S.

ULTRAVIOLET radiation has been used for a number of years in some infectious disease laboratories to provide barriers between hazardous and safe areas and to reduce bacterial contamination.

The decision, by the authors, to recommend installation of ultraviolet lamps in airlocks, in doorways, and on ceilings of selected laboratories and walk-in incubators was made after experiments showed that ultraviolet radiation could be used to separate areas of unequal infectious risk.

Earlier reports dealt with ultraviolet radiation for sterilizing small volumes of bacterially contaminated air and for treating single sheets of paper passed from infectious areas (1, 2).

Dr. Wedum is safety director, Fort Detrick, Army Chemical Corps, Frederick, Md. Mr. Hanel is chief of the Agent Control Branch, Safety Division, Fort Detrick, and Mr. Phillips is a bacteriologist with the Safety Division. This report is one in a series.

Wedum (3) also mentioned the use of ultraviolet racks for cages housing infected animals.

Experimental Methods

Cultures of *Serratia indica* were used in most of our studies. In some tests, normal bacterial flora of the air or surface contaminants were used as indicators of germicidal effectiveness. Aerosols of *S. indica* were produced from 24-hour broth cultures by a DeVilbiss No. 40 nebulizer.

To evaluate the effectiveness of ultraviolet (UV) installations, air was sampled for bacterial content by sieve air samplers (4) with the UV lamps off and on. In some instances liquid impinger samplers were used for the UV-off air samples. The comparative number of organisms recovered and the percent reduction allowed an estimation of the effectiveness of the germicidal radiation.

During these studies some attention was given to the phenomenon of photoreactivation, first described by Kelner (5). Recovery plates

were sometimes prepared in duplicate and incubated under white light and in the dark. However, our experiments called for lethal concentrations of ultraviolet radiation and were performed during the day when generous amounts of white light were present before and during the tests, and no photoreactivation was demonstrated. The average relative humidity in the laboratories during these studies was 56 percent.

Airlocks

In this paper an airlock is defined as a small empty room with a door at each end, constructed to create a dead airspace for a safer passage-way between two areas. Germicidal lamps were installed on the ceiling of a variety of

such rooms and experiments were conducted to determine the effectiveness of ultraviolet radiation in preventing the passage of airborne micro-organisms from area to area.

Tests conducted with one typical airlock illustrate the effect of germicidal radiant energy. Three 30-watt UV lamps were installed on the ceiling in an airlock 8 feet long, 3½ feet wide and 10 feet high. Movement of air between the rooms separated by this airlock was controlled during testing by means of exhaust fans, although in practice the room of greater infectious hazard is kept at a negative pressure.

A meter employing a WL-775 Tantalum photocell and calibrated for response at wavelength 2537Å was used to determine the radiant intensities of energy throughout the airlock. All measurements were taken on a horizontal

Table 1. Ultraviolet intensities in an 8' x 3½' x 10' airlock equipped with three 30-watt lamps

Distance from floor level (inches)	Microwatts per square centimeter						
	Distance in feet from north to south end						
	1	2	3	4	3	2	1
8.....	10	38	43	44	41	40	33
24.....	33	43	44	49	50	48	46
40.....	52	56	57	59	59	59	54
60.....	81	81	80	75	75	74	85
90 (30 inches below ceiling).....	157	118	115	147	112	110	144

Table 2. Bacteriological tests of an ultraviolet airlock using *Serratia indica* as the test organism

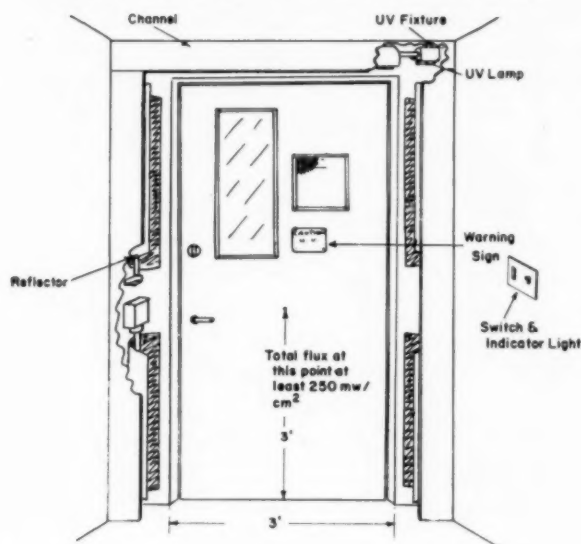
Test number	Air velocity, feet per second	Position of airlock doors	Cloud concentration per cubic foot of air			Percent reduction of <i>S. indica</i>
			At nebulizing position	At collection point past the airlock		
				UV on	UV off	
1.....	2	open.....	408	0.4	43	99
2.....	2	open.....	938	0	81	100
3.....	2	open.....	3,347	0.8	334	99
4.....	(1)	closed.....	110,600	14	² 11,600	99

¹ Leakage around door.

² Estimated.

NOTE: No *S. indica* appeared in control air samples taken before each test. Organisms passing through the airlock were collected with sieve samplers for 5 minutes at 1 cfm. Liquid impingers were used to determine the number of organisms per cubic foot of air at the point of nebulization. The collection efficiency of the samplers is estimated at 95 percent for the liquid impinger and 45 to 70 percent for the sieve sampler.

Ultraviolet lamp installation at doorway.



plane, and the radiation measured represented energy received from above. With the exception of one reading, all areas received at least 30 microwatts per sq. cm. (table 1).

Bacteriological tests were conducted with the doors open and closed. Aerosols of *S. indica* were produced outside the airlock on the upwind side, and samples were taken outside the airlock on the downwind side. The bacterial aerosol concentration was controlled by nebulizing a culture that had been diluted to the desired concentration. Generation of the aerosol continued throughout each test. The results show at least a 99-percent reduction of the bacterial aerosol in every case (table 2). Our experience with a variety of similarly radiated airlocks has shown that few, if any, airborne vegetative bacteria or bacteriophage particles will penetrate such a barrier if air velocities of about 2 feet per second are involved and if the number of UV lamps attached to the ceiling provide a floor intensity of 20 to 30 microwatts per sq. cm.

Doorway Barriers

In the absence of an airlock, an effective barrier can be made by providing a radiation screen across a doorway. A design we recommend for this purpose uses five 17-watt cold cathode UV lamps with aluminum reflectors placed in a wood or metal channel built around the door-

way (see drawing). The channel is placed so that the door opens away from the barrier. In this manner a screen of high intensity ultraviolet radiation is projected across the doorway.

Typical ultraviolet intensities obtained with a door barrier are shown in table 3. Intensity measurements in microwatts per square centimeter from three directions have been added and arbitrarily designated as the "total energy flux."

For bacteriological testing of the typical UV door barrier, cultures of *S. indica* were nebulized either on the upwind or downwind side of the barrier while sieve air samplers were operated on the opposite side. Two conditions were included which reversed momentarily the normal airflow pattern. For example, the pumping action of another door in the room on the positive pressure side (upwind, clean side) would pull airborne organisms from the contaminated room through the barrier door. Similarly, the opening of the barrier door momentarily destroyed the pressure balance and airborne organisms entered the positive pressure clean area.

The results of these experiments are summarized in table 4. In brief, if the total energy flux (table 3) is at least 250 microwatts per sq. cm. at the midpoint in the barrier (see drawing) the ultraviolet radiation will provide significant germicidal action.

Laboratory Ceilings

Unshielded UV lamps can be installed on the laboratory ceiling to provide germicidal treat-

Table 3. Ultraviolet intensities in microwatts per square centimeter at the vertical middle of a door barrier

Feet above the floor	Radiation from above	Radiation from left	Radiation from right	Total energy flux received
6-----	166	142	144	452
5-----	96	126	126	348
4-----	66	113	110	289
3-----	52	126	144	322
2-----	36	96	120	252
1½-----	28	40	30	98

ment of the air and exposed surfaces during periods when the room is unoccupied. Lamps can also be turned on in case of accidental spillage of infectious materials and just before or during pouring of sterile media. We recommend that ceiling lamps be located to provide an intensity of 5 to 10 microwatts per sq. cm. on exposed floor surfaces.

Experiments were conducted in four rooms to determine the reduction in normal airborne bacteria when two 30-watt UV lamps, attached on the ceiling of each room, were turned on for 1 hour. Doors and windows of the rooms were closed and activity held to a minimum during the experiments. Air in the room was sampled for bacterial content with sieve samplers before, during, and after the 1-hour ultraviolet treatment. Samples were taken at the tabletop level with each sampler shielded from direct radiation. The experiment was repeated three times in each laboratory; the averaged results are shown in table 5.

One hour irradiation resulted in an 86-percent decrease in normal airborne bacteria. Common spore-forming bacteria were predominant in the UV-on samples. The number of airborne bacteria increased shortly after the lamps were turned off.

Walk-In Incubators

Conditions in walk-in incubators are generally favorable for the survival or growth of

contaminating micro-organisms. Since incubators usually are not ventilated, the microbial population may be quite high. When infectious cultures are incubated, escape of pathogens from broken flasks or from flasks with missing stoppers may constitute a hazard to persons entering the incubator. Breakage or spillage on a shaking machine or from a culture aeration apparatus may be especially dangerous.

Evaluation studies were made of the effectiveness of ultraviolet radiations in reducing surface and airborne microbial flora in a 9 x 8 foot walk-in incubator room with an 8-foot ceiling. Triplicate samples of air and surfaces in the room (30° C.) were taken for 6 days under three separate conditions and examined for common bacteria and fungi. The conditions were:

1. Control—no ultraviolet.
2. Indirect ultraviolet—one 17-watt cold cathode UV lamp mounted 8 inches below the ceiling in the center of the room and shielded to irradiate upwards.
3. Indirect and direct ultraviolet—condition (2) plus one 17-watt lamp mounted 12 inches below the ceiling and irradiating downward.

With indirect ultraviolet, radiation of from 8 to 35 microwatts per sq. cm. (due mostly to reflectance) was present on the upper shelves in the room, but no radiation reached the floor. When both lamps were burning, 17 to 82 microwatts per sq. cm. of radiant energy was present on the shelves, and the exposed floor area re-

Table 4. Bacteriological tests of an ultraviolet door barrier

Test conditions	Point of nebulization of <i>Serratia indica</i>	Position of sieve samplers	Cloud concentration per cubic foot of air			Percent efficiency of UV door barrier
			At neb- ulizing point	At collection point by sieve samplers		
				UV on	UV off	
Hall door closed-----	Positive pressure side.	Negative pressure side.	40	0	5.4	100
Outside door opened 10 times.	Negative pressure side.	Positive pressure side.	214,000	0.2	58	99.7
Two entrances and two exits by man.	Negative pressure---	Positive pressure side.	214,000	13.2	178	92.5

NOTE: No *S. indica* appeared in control air samples taken before each test. Organisms passing through the barrier were collected with sieve samplers for 5 minutes at 1 cfm. Liquid impingers were used to determine the number of organisms per cubic foot of air at the point of nebulization. The collection efficiency of these samplers is estimated at 95 percent for the liquid impinger and 45 to 70 percent for the sieve sampler.

Table 5. Reduction of airborne bacteria by ultraviolet radiation in four test rooms

Room number	Cubic feet in room	Average bacterial count per cubic foot of air before lamps were on	Lamps on 1 hour						1st 20 minutes bacteria per cubic foot	2d 20 minutes bacteria per cubic foot
			1st 20 minutes		2d 20 minutes		3d 20 minutes			
			Count per cubic foot	Percent reduction	Count per cubic foot	Percent reduction	Count per cubic foot	Percent reduction		
1-----	1, 900	13. 6	4. 6	66. 0	4. 5	67. 0	1. 9	86. 0	4. 1	5. 3
2-----	1, 900	17. 7	10. 4	40. 0	7. 4	58. 0	4. 4	75. 0	7. 4	11. 0
3-----	375	33. 0	4. 4	87. 0	2. 5	92. 5	2. 7	91. 8	4. 2	6. 6
4-----	1, 900	13. 6	3. 2	75. 5	2. 1	84. 5	1. 7	87. 5	4. 7	6. 9
Averages-----	-----	19. 47	5. 65	71. 0	4. 1	79. 0	2. 7	86. 0	5. 1	7. 45

ceived approximately 13 microwatts per sq. cm.

During the 6-day test for each condition, normal use of the incubator was continued. The bacteria and fungi recoverable from the air by sieve samplers and from the walls by moistened sterile swabs during the test periods were reduced by 83 to 100 percent as compared to the controls (table 6). Indirect UV radiation reduced the number of micro-organisms on the floor only slightly. Direct radiation caused an 86.5-percent reduction in floor bacteria on exposed surfaces, but the reduction in numbers of fungi was not determined because of overgrowth by bacteria in the control samples.

Obviously, when ultraviolet is used, the microbial population is reduced and then remains

rather constant. Equilibrium conditions were maintained although normal use of the incubator continued. When indirect UV was used, all air samples were taken close to the floor where no radiation was present. Air circulation was therefore responsible for lower air counts in all parts of the incubator. Of course, no decontamination occurred on surfaces not exposed to radiation.

The reduction of fungi was about the same as for bacteria, in spite of the fact that molds are considered to be 100 to 1,000 times as resistant as bacteria (6). This parallelism suggests that the exposure times used were sufficient to kill even the hardiest micro-organisms, and, in reality, the limiting factor for destruction was the ability or inability of the radiation to reach the cells.

In an additional series of tests, when 4 ml. of an *S. indica* culture (2×10^7 cells per ml.) were nebulized in the incubator, all airborne cells were eliminated in 1 minute by direct and indirect radiation and in 10 minutes by indirect radiation alone. With the UV lamps off, *S. indica* was recovered for 1 hour.

In unreported studies, in which agar plates inoculated with *Brucella abortus*, strain A-19, or *S. indica* were placed in a walk-in incubator room equipped with UV lamps, we have observed that those agar plates placed 3 feet or closer to the lamps must be shielded continuously from the radiations to prevent inhibition of colony growth. Since 2537A radiations will not penetrate ordinary glassware, colony inhibition at distances shorter than 3 feet is

Table 6. Reduction of organisms by continuous ultraviolet in an incubator room (30° C.)

Condition tested	Percent reduction by ultraviolet ¹			
	Indirect ultraviolet		Direct and indirect ultraviolet	
	Bacteria	Fungi	Bacteria	Fungi
Airborne organisms-----	83. 4	84. 7	91. 8	84. 7
Organisms on the floor---	(²)	(²)	86. 5	(³)
Organisms on the walls---	99. 4	92. 0	100	100

¹ Averaged from samples in triplicate taken on each of 6 days.

² Very little reduction.

³ Reduction not determined.

presumably due to the longer wavelengths emitted by the lamps. Ultraviolet radiation is not recommended for incubators if it is critically important to preserve the genetic or nutritional characteristics of the micro-organisms in use.

Safety Measures

Skin or eye protection is not usually required for persons walking through ultraviolet barriers. Protection is required, however, for persons exposed to the radiation for longer than a few seconds. Personnel must be trained not to look at the UV lamps and not to loiter in an irradiated area. We recommend that warning signs and small blue indicator lights and switches be placed at each installation.

A regular maintenance program for lamp testing and cleaning is necessary. Lamps should be turned off and wiped with a soft cloth wet with alcohol. The frequency of cleaning will vary according to the conditions, but in any case the interval between cleaning should not be greater than 2 weeks. Of course, good training and good laboratory housekeeping is of prime importance in preventing the escape of harmful organisms from infectious disease laboratories.

Conclusion

Ultraviolet radiation can be used around doorways and in airlocks to separate areas of unequal infectious risk and to reduce the number of infectious micro-organisms and general contaminants in laboratories and in walk-in incubators.

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Methodology Research Award

Nominations for the Fifth Kimble Methodology Research Award are being accepted until June 1, 1956. This award is given in recognition of scientific investigations affecting public health laboratory techniques.

For rules governing nominations and information on nomination procedures, write to Dr. Thomas S. Hosty, chairman, Nominating Committee, Kimble Award, Bureau of Laboratories, Alabama State Department of Health, Montgomery 4, Ala.

In New Jersey, allocation of State funds to local projects is proving successful in assisting control of chronic illness.

State Grants for Local Projects in Chronic Illness Control

By A. L. CHAPMAN, M.D., M.P.H., and DANIEL BERGSMA, M.D., M.P.H.

"The growing problem of prevention, detection, and care of chronic illness, which is of such a character as not to be exclusively medical, educational, or welfare, has reached such proportions in this State as to require the participation of the State and of the agencies administering public health, education, and welfare within the State, and it has been declared by statute to be the public policy of this State that the responsibility therefor must be shared by the State and the counties and the several municipalities and health districts and voluntary agencies and institutions within the State and the public at large."

THIS statement of public policy is taken from the Prevention of Chronic Illness Act of New Jersey. It represents another evolutionary step in the development of a chronic illness control program in this State—a program which began in 1949 when the Governor appointed a Temporary Committee on the Chronic Sick. The Prevention of Chronic Illness Act, passed in 1952, also called for the establishment of a division of chronic illness control in the State health department, the appoint-

ment of an Advisory Council on the Chronic Sick, and the selection of a Committee of Technical Advisors.

In December of 1952, the Governor called the first of a series of governor's conferences on chronic illness. This conference served to focus the attention of both professional and non-professional health leaders on the importance of the chronic illness problem and the need for concerted effort to solve it. Following this conference the decision was made to allocate State chronic illness funds to local sponsors.

State aid for locally sponsored projects was not a new concept in New Jersey. The basic laws of that State emphasize "home rule." The State health department has for several years contracted with local health departments for the provision of certain local health services. This policy, with only one important change, was simply extended to cover services for the chronically ill. The chronic illness grants-in-aid, however, are not limited to local health departments as are other grants-in-aid. Local boards of chosen freeholders, local nonprofit hospitals, and local voluntary agencies also can sponsor chronic disease grant-in-aid projects.

Contract Specifications

Contracts covering the State-local grants-in-aid are between the State health department and the local sponsor. They call for the provision of specific services in return for a grant-

Dr. Chapman is Public Health Service regional medical director, Region II of the Department of Health, Education, and Welfare, New York City. He was at one time chief of the former Division of Chronic Disease Control, Public Health Service. Dr. Bergsma is State health commissioner of New Jersey.

in-aid, which may be in the form of money, personnel, or equipment.

When a grant-in-aid provides for the employment of personnel, the local sponsor recruits, hires, and supervises the personnel. This arrangement has proved to be more satisfactory than the assignment of State health department personnel to local projects because it gives the local agency a greater sense of responsibility for the project and because other employees accept the new employees as a part of their organization, subject to the same personnel policies. To insure the employment of qualified personnel, the State health department includes in the contract basic minimum qualifications for positions covered in each contract, based on State civil service standards. These qualifications must be met by employees recruited by local sponsors.

At periodic intervals the State health department checks the local program to make sure that the services contracted for are being provided.

Each contract provides for a specific termination date for State aid, after which the project must be maintained solely by the local sponsor. Gradual amortization is usually achieved. The contract may be terminated by either party 60 days after written notification has been given. It provides for quarterly payments to reimburse the local sponsor for actual expenditures, and it calls for the submission of quarterly reports to the State health department.

The contract also requires that the sponsor maintain proper records, make expenditures in accordance with budgets approved by the State health department, and accept general supervision and consultation by the State health department.

Federal grant-in-aid funds allocated to the State health department for the control of heart disease, cancer, and tuberculosis are not included in the State-local chronic illness grants-in-aid. They are allotted to local sponsors in much the same manner as State funds but under separate contracts. A single local sponsor may enter into one or more contracts with the State health department for the State-derived funds and also one or more contracts for federally derived funds.

Scope of Program

The following table shows the planned expenditures for chronic illness grant-in-aid funds during the fiscal year 1955-56. In conformance with the Prevention of Chronic Illness Act, the expenditures are broken down into five general categories:

Category	Amount	Per-cent
Early detection.....	\$102, 685	56
Prevention ¹	2, 500	1
Public health nursing and home-maker services.....	13, 300	7
Rehabilitation.....	47, 160	25
Research ²	20, 049	11
Total.....	185, 694	100

¹ Primary prevention only.

² \$3,400 was allocated directly for research. In addition, 10 percent of the funds originally allocated for early detection and 10 percent of the funds originally allocated for rehabilitation were transferred to the research category.

To illustrate the diversity of activities and the broad geographic coverage that can be achieved by the use of State-local grants-in-aid, a few of the projects that have been or are being undertaken are mentioned.

Nine local hospitals have been assisted in developing multiple screening services for hospital personnel and all persons admitted to the hospital. Four hospitals are utilizing State aid to develop rehabilitation services. Two hospitals are engaged in evaluating screening tests related to diabetes control. Four community hospitals have made pilot studies of rheumatic fever prophylaxis.

The need for including bedside nursing among the services routinely offered by public health nurses has been recognized, and a study has been authorized to develop this type of program conversion. Seven community home-maker services are now functioning in New Jersey. One of these, organized on a county basis, is being assisted with a grant-in-aid to demonstrate the importance of a trained medical social worker in this field.

Two large projects are providing rehabilitation services in county institutions and hospital centers. For these projects, the grants-in-aid are in the form of trained personnel and labor-saving equipment.

A significantly large sum of money has been allotted to a medical center to provide screening services to patients of private physicians upon request. Five outpatient alcoholism clinics have been started in local hospitals.

Other local projects being developed through the grants-in-aid program include multiphasic screening of State employees, cervical cancer screening in demonstration hospitals, and screening for hearing defects and the rehabilitation of the hard of hearing in two hospitals.

This is not a complete list of the many local chronic disease projects in which the New Jersey State Health Department is participating. However, it does serve to indicate how quickly and effectively a large number of institutions, agencies, and people can become involved in developing local services for the chronically ill through the expenditure of a relatively small amount of money.

The chronic illness activities of the State health department are not limited to the allocation of grants-in-aid. The division of chronic illness control is responsible also for coordinating all health services which are designed to assist the chronically ill, for public and professional education, and for planning a long-range coordinated control program.

Achievement of Objectives

The operation of a grant-in-aid program in no way negates the need for basic research work, the objective of which is to determine the causes of the degenerative and malignant diseases. Nor does it prevent the normal entrance of many nonsubsidized individuals, agencies, and institutions into the field of chronic illness control. The program does favor the more rapid achievement of several important public health objectives:

1. It almost automatically enlists the interest and support of many professional people in local chronic illness control activities.
2. It multiplies the resources and personnel engaged in chronic illness control.
3. It offers new opportunities for learning

how to provide local services that are better designed to find, treat, and rehabilitate the chronically ill.

4. It builds on spontaneous local interest where it exists. This tends to insure the efficient and economical administration of projects and favors their continuance when State aid is withdrawn.

5. It permits the State health department to exert leadership in the evolution of the chronic illness control program by selecting from among the many local applicants those that can contribute most effectively to the planned statewide program.

The rapid expansion of interest in New Jersey in chronic illness control is evidenced by the increasing popularity of the several governor's conferences which have been held since the original conference in 1952. Subsequent conferences have been held on diabetes, cardiovascular diseases, alcoholism, and new horizons in chronic illness control, including rehabilitation. All of these conferences have attracted large audiences and have resulted in excellent publicity. As a result, where originally there was a dearth of local applicants for the grant-in-aid funds, there now is a plethora.

The State-local chronic illness grant-in-aid mechanism in New Jersey is succeeding in increasing the number and quality of services offered locally to persons with chronic illness. Its important features are its simplicity of operation and its persuasiveness in obtaining the participation of local people in the solution of their own problems. Other State health departments might find that their chronic illness program can be accelerated by the adoption of the grant-in-aid mechanism.

Chronic disease grants-in-aid have proved to be, in part at least, an answer to a statement the Governor of New Jersey made in 1952: "Unless something is done by the way of effective prevention, there must inevitably be greater outlays for institutional care, and we must bear all the additional social costs—the costs in human suffering and in damaged family relationships."

Environmental Health Program and Budget in Local Health Departments, 1954

DATA on the administration of environmental health services in local health departments were obtained during 1954 by means of questionnaires sent to all members of the Conference of Municipal Public Health Engineers. Of the 39 replies received from members associated with local programs, 35 provided information with sufficient detail and completeness to be used in the study.

In a similar study in 1951, data were obtained from 41 local health departments. Many of these data are used here for comparison. However, because not all the departments that reported in 1951 were included in the 1954 study, comparisons between the two studies are not entirely valid. As shown in table 1, only 21 of the 41 departments that reported in 1951 also reported in 1954. There is more overlap among the departments serving populations of 200,000 or more than there is among the smaller departments.

Generally speaking, the proportion of large health departments in both the 1951 and the 1954 samples is greater than the proportion in the total number of local health departments. For example, in 1951 local health departments serving populations of 500,000 or more represented 2.2 percent of all full-time local health departments (1). In the 1951 study, they represented 24 percent of the sample, and in the 1954 study, 47 percent.

Program Coverage

To obtain a picture of the program coverage provided by the 35 local health departments, analyses were made on the basis of 16 major

classifications, as shown in table 2. A health department was credited with an activity only if a comprehensive program was indicated. For example, animal disease control had to include more than just animal bite investigation.

Most of the departments (more than 80 percent) maintained routine inspection activities with respect to water, sewage, bathing places, food, and milk. More than half of the departments reported inspection activities in refuse disposal, meat, pest and vector control, institutions, and schools; and more than a quarter reported programs in housing, barber and beauty shops, air pollution, and industrial health. There seems to have been a significant increase in the number of departments reporting routine housing and air pollution control activities in 1954 as compared with 1951.

Some of the more recently recognized environmental health activities were being conducted by the following percentages of health departments: noise control, 24 percent; noxious weed control, 15 percent; home accident prevention, 27 percent; radiation protection, 35 percent.

In most of the program areas, fewer departments provided consultation services than routine inspection services. Exceptions to this were programs in plumbing, pest and vector control, animal disease control, air pollution control, and industrial health.

Of particular interest was the information reported on the degree of specialization in the administration of routine environmental health activities. In recent years there has been a trend in some departments toward a general-

ized sanitation program, that is, a program carried out by generalized, rather than specialized, personnel. However, both specialized programs and generalized programs have advantages and disadvantages. Which of the two is the more economical in terms of both cost and effectiveness remains to be determined.

All activities can be carried out by specialized personnel, but the data in table 3 indicate that certain activities are more often carried out by specialized personnel than others. Activities in the following areas were reported specialized by more than half the departments: plumbing, milk, pest and vector control, animal disease control, and industrial health.

Table 1. Comparison of the 1951 and 1954 groups of local health departments included in the studies

Population served	Number of departments reporting		Departments reporting in both 1951 and 1954	
	1951	1954	Number	Percent of 1954
Less than 100,000-----	3	3	1	33
100,000-199,999-----	13	8	3	27
200,000-499,999-----	15	10	6	60
500,000 or more-----	10	14	¹ 11	79
Total-----	41	35	21	60

¹ Dallas, Tex., St. Louis County, Mo., and Jefferson County, Ala., were reported in the 200,000-499,999 group in 1951 and in the 500,000 or more group in 1954.

Although there are certain activities that are more amenable to generalization than others, the data in table 4 suggest that there may also be budgetary reasons for generalization. When grouped according to the percentage of activities specialized, the health departments varied little in the average number of activities performed. However, the average per capita budget and the average per capita expenditure per activity were nearly twice as much for the departments having the highest degree of specialization as for those with the least degree of specialization.

It would be presumptuous to conclude from these few data that an activity performed under

Background of Report

This paper is based on an excerpt from a report of the Executive Committee of the Conference of Municipal Public Health Engineers. In addition to the material presented here, the report includes information on such items as salaries for directors of sanitation, sanitary engineers, sanitarians, and sanitary inspectors; policies on pay increases, holidays, overtime, vacations, sick leave, pensions, and reimbursement for transportation; professional background, educational level, and age distribution of professional sanitation personnel; and the number of clerical personnel in sanitation departments.

The study was initiated in 1954 by P. W. Purdom, director of the division of air pollution control and environmental sanitation, Philadelphia Department of Public Health, when he was chairman of the Conference of Municipal Public Health Engineers. The data were analyzed and compiled in report form by Walter A. Lyon, assistant chief of the environmental health section, Philadelphia Department of Public Health, and a member of the Conference of Municipal Public Health Engineers.

a generalized program costs less than the same activity under a specialized program. Nevertheless, such a conclusion would be supported to some extent by Fisher's observation that nearly one-third of a sanitarian's time is spent in travel (2). In a generalized program, the amount of travel is considerably reduced because (a) each sanitarian can cover a smaller geographic area and (b) overlapping of the same travel route by two or more sanitarians rarely occurs. To reach any valid conclusions concerning the economy of a generalized program, we would have to know more about the program coverage and the effectiveness of the activities in comparison with these facets of a specialized program.

Program Costs

Comparison of budget figures for environmental health programs in various health departments needs to be approached with caution, particularly when the departments vary widely

Table 2. Types of services provided by local health departments in specified environmental sanitation activities, 1954

Activity	Routine inspection service		Consultation service		Routine inspection and consultation service	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
Water.....	30	85.8	26	74.4	22	62.9
Plumbing.....	8	22.9	10	28.6	2	5.7
Sewage.....	30	85.8	24	68.6	20	57.1
Bathing places.....	32	91.5	18	51.4	15	42.9
Refuse disposal.....	19	54.2	18	51.4	11	31.4
Food.....	34	97.0	14	40.0	13	37.1
Meat.....	25	71.4	12	34.3	8	22.9
Milk.....	31	88.5	14	40.0	13	37.2
Pest and vector control.....	19	54.2	24	68.6	12	34.3
Animal diseases.....	3	8.6	7	20.0	3	8.6
Housing.....	16	45.7	10	28.6	7	20.0
Barber and beauty shops.....	9	25.7	7	20.0	4	11.4
Institutions.....	21	60.0	17	48.6	9	25.7
Schools.....	23	65.8	17	48.6	11	31.4
Air pollution.....	10	28.6	15	42.9	7	20.0
Industrial health.....	10	28.6	18	51.4	5	14.3

¹ All 35 health departments=100 percent.

in terms of population served and scope of program, as do those included in this study. Nevertheless, such data give some idea as to the amount people are willing to pay for environmental health services.

Budget data for the 35 local health departments, which served populations ranging from 18,000 to 2,000,000, are given in table 5. The average per capita sanitation program budget was 44 cents, with a range of 11 cents to 96 cents. Although the variation was rather wide, there were health departments in each population group with budgets near each end of this range. Environmental health divisions which were on the lower end of the per-capita-budget scale were also receiving a smaller portion of the health department budget. For example, environmental health divisions that reported a budget of less than 25 cents per capita received a median 18 percent of the health department budget, whereas those with a budget of 75 cents or more per capita received a median 40 percent of the health department budget.

The average per capita cost per sanitation activity was 4.8 cents. (As used here, and elsewhere in this report, "activity" refers to such program classifications as those listed in tables 1 and 2.)

For comparison with the 1954 data, the budget

data reported by 32 health departments in 1951 are also given in table 5. The average per capita health department budget was somewhat greater in 1954 than in 1951 for the larger departments. However, with the exception of one population group, there was little difference between the 1951 and the 1954 average per

Table 3. Degree of specialization in environmental sanitation activities, 1954

Activity	Local health departments reporting		
	Total number	Number specialized	Percent specialized
Water.....	30	4	13
Plumbing.....	8	5	63
Sewage.....	30	4	13
Bathing places.....	32	4	13
Refuse disposal.....	19	0	0
Food.....	34	13	38
Meat.....	25	12	48
Milk.....	31	27	90
Pest and vector control.....	19	11	58
Animal diseases.....	3	3	100
Housing.....	16	6	38
Barber and beauty shops.....	9	1	11
Institutions.....	21	1	5
Schools.....	23	2	9
Air pollution.....	10	0	0
Industrial health.....	10	6	60

capita sanitation program budgets. This exception was the 200,000-499,999 population group, for which the average per capita sanitation budget increased significantly between 1951 and 1954. As pointed out earlier, 6 of the 10 departments in this group reporting in 1954 also reported in 1951, and 3 of the remaining 4 reported considerably lower than average per capita sanitation budgets. Hence, most of the departments in the 200,000-499,999 group apparently received a significant increase in their sanitation program budgets during the 1951-54 period. That observation is substantiated by the fact that this group of departments was

the only one that reported a reduction in population per professional sanitation worker—from 15,300 to 14,500—between 1951 and 1954. For all departments, the population per professional sanitation worker increased from 13,300 in 1951 to 16,900 in 1954.

The 1954 average per capita sanitation program budget of 44 cents is four times the average amount (11 cents) spent by State health departments for environmental health services in 1950 (3). Environmental health divisions in local health departments absorbed, on the average, 25 percent of the total health department budget, whereas in State health departments

Table 4. Average per capita budget, average population served per professional worker, average number of activities, and average per capita cost per activity for 35 local health departments grouped according to degree of specialization, 1954

Percent of activities specialized	Number of health departments	Average per capita budget	Average population per professional worker ¹	Average number of activities	Average per capita cost per activity
0-24.9-----	14	\$0. 307	22, 000	8. 4	\$0. 037
25-49.9-----	13	. 488	14, 300	10. 0	. 048
50-74.9-----	4	. 639	12, 250	9. 8	. 065
75-100.0-----	4	. 576	12, 300	8. 3	. 070

¹ All sanitation personnel, except clerical and labor.

Table 5. Budget data for local health departments, by population served, 1951 and 1954

Population served	Year	Number of departments reporting	Per capita budget								
			Average			Maximum			Minimum		
			Total	Sanitation	Percent sanitation of total	Total	Sanitation	Percent sanitation of total	Total	Sanitation	Percent sanitation of total
Less than 100,000-----	{1951-----	3	\$1. 75	\$0. 37	21. 2	\$2. 75	\$0. 65	23. 6	\$0. 60	\$0. 16	26. 7
	{1954-----	3	1. 40	. 34	24. 3	1. 95	. 51	33. 9	. 75	. 18	17. 2
100,000-199,999-----	{1951-----	11	1. 47	. 39	26. 5	2. 85	1. 02	35. 8	. 66	. 17	25. 7
	{1954-----	8	1. 70	. 39	22. 9	2. 59	. 56	41. 2	1. 11	. 19	14. 5
200,000-499,999-----	{1951-----	10	1. 17	. 33	28. 3	2. 01	. 45	22. 3	. 68	. 15	22. 1
	{1954-----	10	1. 62	. 53	32. 7	2. 56	. 96	87. 7	. 84	. 19	13. 0
500,000 or more-----	{1951-----	8	1. 86	. 45	24. 2	3. 00	. 69	23. 0	1. 20	. 29	24. 1
	{1954-----	14	1. 73	. 43	24. 8	2. 70	. 88	40. 0	. 60	. 11	10. 8
All departments-----	{1951-----	32	1. 50	. 38	25. 4	3. 00	1. 02	35. 8	. 60	. 15	22. 1
	{1954-----	35	1. 66	. 44	26. 5	2. 70	. 96	87. 7	. 60	. 11	10. 8

only 7 percent of the total health department budget was spent for environmental sanitation in 1950 (4). Although State expenditures for all health services increased by 245 percent during the period 1940 to 1950, expenditures for environmental health increased only 31 percent.

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Constitutionality of Temporary Committal Of the Mentally Ill by Medical Certification

The Supreme Judicial Court of Maine in the case of *In re Opinion of the Justices*, 117 A. 2d 63 (May 18, 1955), has held that a statute may constitutionally provide for the temporary confinement (35 days) of a mentally ill person who is certified by a physician as being "likely to injure himself or others if not immediately restrained" provided that the statute also provides adequate methods by which persons so hospitalized may "institute (judicial) proceedings to test the necessity of their commitment."

This question was presented to the court by a request for a declaratory judgment on the constitutionality of a proposed bill governing the commitment of the mentally ill. In a prior decision, *Appeal of Sleeper*, 87 A. 2d 115, this court held that where, as here, the temporary confinement is not ancillary to the institution of judicial proceedings the law requires that the person hospitalized be given an opportunity to institute judicial proceedings to test the necessity of his confinement and that this need is not satisfied by the availability of the writ of habeas corpus.

In the present case, the proposed bill adopted the language of section 17 of the Draft Act

Governing Hospitalization of the Mentally Ill (Public Health Service Publication No. 51). It provides that a patient who applies for his release shall be released within 48 hours unless the superintendent of the hospital certifies to a court of proper jurisdiction that in his opinion such release would be unsafe to the patient or others. In this case the patient may be detained for the length of time, not exceeding 5 days, necessary to institute judicial commitment proceedings.

Assuming, as this court apparently did, that the "temporary" 35-day commitment involved in this case must meet the same due process requirements as an indefinite hospitalization by medical certification, the court appears to have taken a different view than that adopted by the Supreme Court of Missouri in *Missouri ex rel. Fuller v. Mullinax*, 269 S. W. 2d 72 (Public Health Reports, October 1954, p. 982). That decision declared that such indefinite hospitalization without an opportunity for prior judicial proceedings was unconstitutional despite the presence of the remedies provided for by section 17 of the Draft Act.

Most of the recent reports on infectious hepatitis epidemics have concerned children in schools and institutions. The subjects of the epidemic in the Elgin State Hospital were adult mental patients.

Infectious Hepatitis Epidemic in a Mental Hospital

By OTTO L. BETTAG, M.D., FREDERICK PLOTKE, M.D.,
WERNER TUTEUR, M.D., and GUDRUN HERBORN, M.D.

DISCOVERY of any communicable disease in a mental hospital is cause for special concern. The inability or reluctance of many patients to verbalize their physical complaints frequently minimizes or rules out the possibility of early discovery and treatment. Then, too, overcrowded living quarters, intimate contact, and promiscuous defecation habits are conducive to the extension of communicable disease.

For a disease such as infectious hepatitis, poor personal hygiene and resultant unsanitary conditions constitute particularly formidable obstacles to the development of effective control measures. Certain segments of the patient population, by the very nature of their mental illness, are unable or unwilling to cooperate fully in control measures necessary to reduce the danger of an epidemic.

Thus, at Illinois' Elgin State Hospital for the mentally ill, about 40 miles northwest of

Chicago, such conditions contributed to the spread of infectious hepatitis cases, which occurred in unprecedented number from October 20, 1953 to March 15, 1954. Altogether there were 100 cases in the adult patient population of about 6,800 (see table).

Ninety-five of the 100 cases occurred in three overcrowded cottages on the north side of the grounds, Hirsch, Holden, and Hawley, housing regressed and untidy women patients. The remaining 5 cases occurred in 4 widely scattered cottages and wards for men, located on the opposite side of the grounds (fig. 1). Two of the men's cottages, Wilson, 1 case, and Kilbourne, 2 cases, housed deteriorated and untidy patients.

In general the epidemic did not follow a definite pattern. Explosive outbursts in the three women's wards were followed by a leisurely development of secondary cases. Among the men, 3 of the 4 wards developed no additional cases. Brodribb (1) and others have noted the appearance of cases in periodic batches, approximating monthly intervals.

The highest concentration of cases appeared at Hirsch Cottage, where the first two cases were found on October 20, 1953. From that date until February 13, 1954, there were 62 infectious hepatitis cases among the 267 severely regressed residents, an attack rate of 23 percent

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(fig. 2). The rated bed capacity is 83 patients per unit.

Holden Cottage, adjacent to Hirsch, had the second highest attack rate, 8.7 percent. From February 8 to March 15, 1954, 17 cases occurred among 194 aged, ambulatory, deteriorated women patients. The rated bed capacity of this cottage is 96 patients.

At Hawley Cottage, separated from Hirsch by cottages and grounds, 16 infectious hepatitis cases were observed from February 2 through February 20, 1954. These cases involved 6.5 percent of the 244 generally elderly and disturbed patients in the cottage. Like Hirsch the rated bed capacity is 83 patients per unit. Figure 3 shows the distribution of cases at Holden and Hawley.

Single cases occurred at Wilson Cottage December 15, 1953, and the annex, December 23. Two cases occurred at Kilbourne Cottage January 14, 1954, and one case at B I, a ward in the administration building, January 17.

No infectious hepatitis was found in any of the hospital employees or any of their family members. Approximately 1,000 employees working on a 7-day 3-shift schedule look after the welfare of the patients. The personnel live on the grounds, in the city of Elgin, or in the surrounding area. They were permitted to circulate freely on the grounds and in the town.

The employee experience at Elgin varies from that noted by Capps and associates (2) in an orphanage for children under 3 years of age. Over a period of 8 years, 72 student nurses and 3 other adults contracted infectious hepatitis from the children. Outbreaks were ultimately eliminated by emphasis on aseptic nursing techniques.

Epidemiological Investigation

Upon recognition of the epidemic an immediate, diligent investigation was made to discover the mode of transmission. The propagation of the infection by a common vehicle was considered, but so far as could be determined the water, food, and milk supplies were not contaminated. The results of all standard bacteriological tests were within the accepted normal limits. All plumbing fixtures are equipped with backflow preventers, and there was no back stoppage in

the sewage disposal systems on the involved wards. Furthermore, only 7 of the 26 cottages using the common water supply and sewage disposal system at the institution experienced an outbreak. The individual syringe technique is practiced throughout the institution in the immunization program.

Although no cases were observed among the employees, the possibility that they might harbor the virus and unwittingly spread the infection was always considered. Employee practice of proper hygiene, particularly frequent handwashing, was stressed as a precautionary measure both for themselves and their patients.

Despite investigation and followup, the exact vehicle of contamination or mode of transmission was never ascertained. While the habits and practices of the patients lend credence to the fecal-oral route, suggested by Lilienfeld and others (3) as the general mode of transmission, the relatively confined area of the spread of attack, in the absence of contradictory evidence, points to a carrier as the most likely source of origin.

Diagnosis and Management

It is generally conceded, that although mortality from infectious hepatitis is low, its protracted convalescent period and possible liver

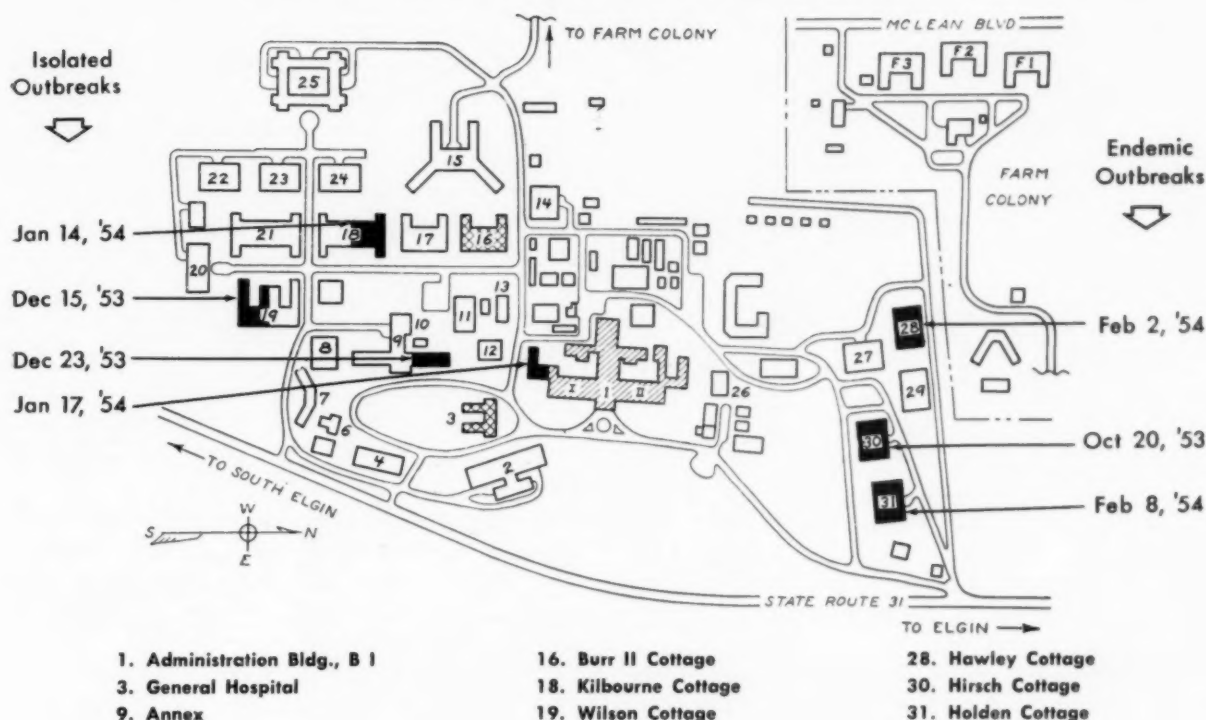
Age and sex distribution of infectious hepatitis patients, Elgin (Ill.) State Hospital

Age (years)	Women	Men	Total
20-30	10	0	10
31-40	22	2	24
41-50	21	3	24
51-60	16	0	16
61-70	12	0	12
71-80	11	0	11
81-90	3	0	3
Total	95	5	100

damage, particularly in adults, warrants careful and extended followup and treatment in the early stages if serious after-effects are to be avoided.

The outstanding and most common clinical symptoms among the hepatitis patients were fatigue, listlessness, headaches, anorexia, nau-

Figure 1. Patient residences at Elgin State Hospital, Illinois.



sea, and diarrhea. Jaundice was observed in about one-third of the cases. All contacts, residents as well as employees in wards housing patients with infectious hepatitis, were given screening tests, including cephalin flocculation and urine urobilinogen. Residents exhibiting suspicious clinical or laboratory findings of the infection were sent to bed for observation pending confirmation of the diagnosis.

On discovery, the patients with infectious hepatitis were isolated and the affected cottages were quarantined. With the exception of the administration of gamma globulin and achromycin and special regimens for the acutely ill, the treatment and control measures were similar at the isolation units.

Preventive measures included separate garbage disposal and linen pickup. Food was served on disposable paper dishes. The basic treatment plan was relatively simple. It consisted of strict bed rest, a diet high in proteins and carbohydrates and low in fat content, a daily subcutaneous injection of 100 mg. of vitamin B₁, and intravenous injection of isotonic fluids when there were indications of dehydration.

For Hawley and Holden hepatitis patients, an isolation unit was established at Hawley Cottage. The mounting number of Hirsch patients required various arrangements for their isolation and care.

Shortly after the discovery of the first two cases at Hirsch on October 20, a special isolation unit was set up within the cottage, and the cottage was placed under modified quarantine.

Figure 2. Distribution of infectious hepatitis cases at Hirsch Cottage.

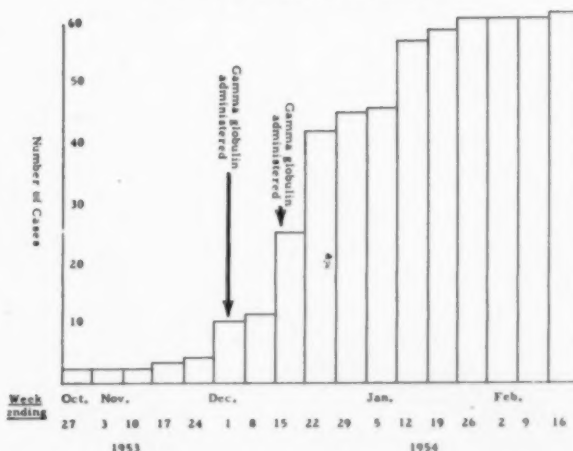
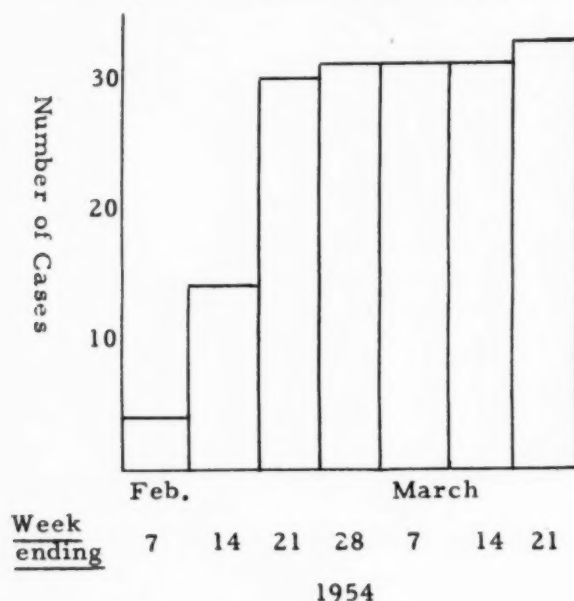


Figure 3. Distribution of infectious hepatitis cases at Hawley and Holden Cottages.



Patients were not permitted visitors from inside or outside the institution grounds, nor were they permitted to leave the cottage.

After December 1, 1953, when 10 Hirsch residents had developed the disease, all the sick patients were transferred to the institution's acute disease hospital.

By December 15, when the Hirsch cases totaled 25, the limited facilities of the acute disease hospital were severely taxed, and the infectious hepatitis cases constituted a possible hazard to the other hospitalized patients. A special isolation unit for Hirsch hepatitis patients was set up in Burr II Cottage, an infirmary for women on the south side of the grounds.

The Burr isolation ward was created by subdividing 1 of the 2 dormitories. The entire cottage, with an average of 193 patients, was quarantined.

On January 14, 1954, the Hirsch patients, 57 by this time, were returned to Hirsch Cottage, which continued under quarantine. Attending nursing personnel moved with the patients, and a special unit designated for recuperation purposes functioned until April 18, 1954.

On arrival at the Burr isolation unit, the majority of the patients exhibited mild symptoms of infectious hepatitis—diarrhea and

vomiting which stopped in a few days. Several had a moderate degree of liver enlargement.

Ten patients were seriously ill upon arrival. They developed temperatures ranging up to 104° F., severe jaundice, diarrhea, and vomiting, icterus indexes up to 10, and cephalin flocculation tests of 4-plus intensity.

Treatment of the 10 severely ill patients was supplemented by 500 mg. of aureomycin administered four times a day. Five percent glucose in saline infusions, together with vitamins B and C, were given when indicated.

Five of these patients, who exhibited low blood pressure, experienced decompensation of the cardiovascular system. They received supportive therapy in the form of digitalis, coramine, and caffeine.

One patient developed severe bilateral parotitis, in all probability caused by inadequate oral hygiene. One epileptic in this group continued to receive anticonvulsant medication in the form of dilantin-sodium and luminal, 1½ grains of each three times daily.

Three of the acutely ill Hirsch patients died. For none of these, however, did the clinical records indicate infectious hepatitis to be the primary cause of death. Three deaths were also reported from the Hawley isolation unit, 2 of patients more than 80 years old and the other 75. Here again, there was no indication in the records that infectious hepatitis was a factor in the deaths.

Gamma Globulin

Other workers (4) have reported that gamma globulin administered during infectious hepatitis epidemics has provided a high degree of protection to exposed persons.

As a preventive measure at Hirsch Cottage, 5 cc. of gamma globulin was administered to each noninfected resident on December 1, 1953. Personnel working at Hirsch (and later at the other affected cottages) were offered the same dosage on a voluntary basis, with most of them consenting to the injection.

On December 14, the remaining 242 noninfected patients at Hirsch and the employees received another 5 cc. of gamma globulin.

This attempt to control the epidemic was only moderately successful since 37 new cases devel-

oped subsequently among patients thus treated, the last one on February 13, 1954. They occurred the following dates:

Date	Cases
Dec. 15-31, 1953-----	21
Jan. 1-14, 1954-----	11
Jan. 15-31, 1954-----	4
Feb. 1-13, 1954-----	1

No gamma globulin was administered to any of the Hawley or Holden residents. But the Hawley patients with infectious hepatitis received 2 grams of achromycin daily for 5 days, while the other residents received a prophylactic dosage of 1 gram of achromycin daily for 10 days. None of the Holden residents received achromycin.

The 171 noninfected residents at the Wilson and annex units were given 5 cc. of gamma globulin. No further outbreaks were reported at either location.

Neither gamma globulin nor achromycin was administered to the residents of Kilbourne and of the affected wing of the administration building. No new cases were noted at these locations.

Psychiatric Improvements

One of the outstanding developments noted in the course of the epidemic was a marked psychiatric improvement among patients in isolation wards. Similar improvement was reported by Galioni and associates (5) in a study under comparable conditions. While on isolation status, the patients enjoyed greater personal attention than they ordinarily received in the overcrowded units.

Patients who had been in need of toilet training or had been untidy and preoccupied with their excretions prior to their transfer to the isolation units often conquered these shortcomings within 48 hours. Many who had been mute and uncommunicative and were unable to verbalize attempted to make their wishes known to attending personnel within 3 to 5 days after arrival. Many months of intensive psychotherapy would have been required to achieve a similar reaction.

This transient improvement was emphasized by the relapse of the patients into their former condition when special attention and personnel

were withdrawn on the return of the patients to their original wards.

On the other hand, no further mental deterioration was noted in the patients during or following the disease, even among the senile group, although such sequelae were reported by Noyes (6).

Summary and Conclusions

During the fall and winter of 1953-54, 100 cases of infectious hepatitis in adult mental patients were observed and treated at the Elgin (Ill.) State Hospital.

The highest incidence of cases, 98 out of 100, appeared in cottages housing the more deteriorated and untidy patients; 62 were discovered in a residence for severely regressed women possessing poor personal hygienic habits and living under grossly overcrowded conditions.

No uniform pattern of attack could be determined such as appearance of groups of cases at periodic intervals.

The lack of incidence among hospital employees caring for the patients was ascribed to high standards of personal hygiene and sanitation among the personnel.

The vehicle of contamination or mode of transmission was never ascertained, although exhaustive and continued investigation excluded, we believe, the water and food supplies and the sewage disposal system as the source. The fecal-oral route is suspected, but the area of spread also points to person-to-person contact with a carrier as a likely mode of transmission.

Marked psychiatric improvement was observed among patients transferred from overcrowded wards to isolation units or convalescent centers where they received greater individual attention and consideration. The gains were lost on return to their regular quarters.

The success reported with the use of gamma globulin in the early exposure stage during similar epidemics was not duplicated at Elgin Hospital. Thirty-seven cases developed at Hirsch Cottage during a period of 61 days following inoculation. Equivalent cessation of the secondary attack rate was experienced at Hawley and Holden where no gamma globulin was given. No spread of the disease occurred at the units housing the sporadic cases regardless

of gamma globulin administration. Possibly this agent is not as efficacious for deteriorated mental patients possessing low standards of sanitation as for other groups.

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A Patients' Opinion Survey at Firland Sanatorium

By CATHERINE E. VAVRA, R.N., M.P.H.,
and EDITH DYER RAINBOTH



U. S. Navy photograph

WHEN Firland Sanatorium wished to find out the patients' opinions about their care and treatment so that it could make changes which would lead to greater satisfaction, it was evidence of a realization that the psychological reactions of patients affect their recovery. It also indicated the willingness of the hospital staff to see themselves through the eyes of the patient.

Some of what the staff saw pleased them very

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Miss Vavra's first report on the Firland survey appeared in the American Journal of Public Health, September 1952. The present report is based on her paper for the annual meeting of the Western Branch, American Public Health Association, April 20, 1955, in Phoenix. The full report (181 pages) has recently been published and may be obtained from the Anti-Tuberculosis League of King County, Wash.

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much, but some of what they learned gave them insight which resulted in administrative changes in personnel, improved ways of counseling patients and assigning the nursing staff, better arrangements for good housekeeping, and specific modifications for the patients' comfort.

The Hospital Setting

Firland Sanatorium, the King County (Wash.) hospital, had moved to its present location on the north side of Seattle about 4 years before we undertook a patient opinion survey in May 1951. The new location had formerly been occupied by the Seattle Naval Hospital. After the move, the sanatorium had met the usual problems of expansion from a 400-bed unit to one of 1,300 beds, housed in 54 buildings on 160 acres of ground. Twenty-one physicians and 115 registered nurses were working full time in an administrative plant of 5 medical services, each service headed by a medical chief. The hospital was handicapped by the shortage of graduate nurses.

The medical and nursing staffs are assisted by social workers, occupational therapists, dietitians, vocational counselors, teachers, a dentist, and dental technicians. Other employees include practical nurses, nurse aides, food-service and housekeeping personnel, janitors, orderlies, and so forth, bringing the aver-

age number of employees to about 916 at the time of the survey.

Firland is fortunate in having more than adequate recreation facilities. Ambulatory patients have access to a lounge, an auditorium, a workshop, library, poolroom, music practice room, greenhouse, modern kitchen (for teaching work simplification and energy conservation), printing press, and television programs.

Movies and a patient-operated store are the most popular ways of passing time for patients having limited activity status. Mail is taken to the wards every day from a branch post office at the hospital. The large grounds and numerous pathways encourage the enjoyment of picnics and walks. A central intercommunication system and earphones or pillowphones bring the pleasure of music and entertainment programs to the bedridden. Up-patients wheel magazine carts to the patients in bed and contribute to their happiness in many ways. Many patients have their own radio or television set.

A patients' council representing the wards meets with the hospital staff to work out solutions to any grievances. Weekly broadcasts by the medical director and the reading of the hospital bulletin over the intercom help supplement the personal contacts of the professional staff and patients. Each newcomer on admission receives a pamphlet, "Welcome to Firland," explaining the rules of the hospital. Four teachers work with patients taking elementary or high school courses through an arrangement with the Seattle public schools. Religious counseling is always available, and services are held once a week or more often.

Each patient is assigned to one of the five medical services, where he usually remains from the time of admission except for temporary assignment to a surgical unit when necessary. It is hoped that this procedure gives him a feeling of continuity in his treatment and contributes to his personal relationship with his physician.

The Hospital Patients

At the time of the study (May 1951) the patient census was 1,137. The supervising nurses reported that 198 patients were ineligible for the study because they were too ill, too young, or had language difficulty, or were absent be-

cause of town leave or treatment. Of the 939 eligible patients, 91.3 percent (857 patients) completed their questionnaires.

The patient population studied (857 patients) was 60 percent male and 40 percent female. Ages ranged from 15 to 91 years. Forty percent of the men were under 40 years of age, while 75 percent of the women were in this age category. Thirty-six was the median age of all patients. Half (48.9 percent) of the women were single, widowed, divorced, or separated, but two-thirds (67.5 percent) of the men were in this category of the unmarried.

The median year of school completed by patients 25 years old and older was 11 (10.7) years, a little lower than the amount of schooling (median year 12.1) completed by Seattle residents. Twenty-seven percent had finished high school. An additional 20 percent had some college education.

Admission to Firland was the first admission to any tuberculosis hospital for 68 percent of our patients. Twenty-five percent had been here for less than 6 months, another 25 percent for 24 months or more. Eight percent had relatives who were also patients in a tuberculosis hospital. Approximately two-thirds of the patients were restricted to bed rest. Some lonely individuals (7.4 percent) never had any callers, but almost two-thirds (61.6 percent) of the patients had visitors once a week or more frequently.

Three hundred five of the participating patients were in private rooms, and the remaining 552 were in wards of approximately 66 beds each.

Need for the Study

Studies similar in purpose to our study at Firland have been made in recent years to ascertain whether patients were satisfied with the hospital care they were experiencing (1-4). Concern as to why patients leave the hospital against medical advice has led to studies of the reasons they give for not remaining until their discharge is recommended. Concern over irregular discharges was the basic reason for the Firland study.

In 1950, 44 percent (299) of all live discharges at Firland were against medical advice.

At first glance this rate appears to be high, but undoubtedly it is affected by the sanatorium's high standard of medical discharge. A patient had to demonstrate the stability of his tuberculosis over a minimum of 3 months by 7 or more hours of daily activity.

The challenge of reducing the number of irregular discharges, reactivations of the disease, and the resulting readmissions prompted the medical director and the business manager of Firland Sanatorium to initiate the patient opinion survey. By having all hospital staff members become more aware of the factors in total patient care which contribute to satisfaction and dissatisfaction, they hoped to encourage the staff to modify any practices which might hamper wholehearted cooperation with the prescribed treatment.

The purpose of this study was to obtain useful information in the operating situation. It might be described as action research in an applied setting. By obtaining patients' responses to a large number of questions, some of which were open-end, free response types of questions, we hoped to obtain information which might provide a somewhat better basis for administrative planning. No claim is made that this study is basic research of the real attitudes and beliefs of our patients. However, we feel that this type of action research did tend to point up some specific areas of satisfaction and dissatisfaction which might have some real meaning for all institutions concerned with long-term care.

Conducting the Study

The methodology of our study contains these six features which helped increase its effectiveness:

1. The cooperation of the patients' council in wording the questions, in pretesting the questionnaire for clarity and ease of administration, and in distributing and collecting responses.
2. The use of both open-end and closed-end types of questions.
3. The patients' rating of hospital personnel on 10 designated personal traits such as "interested in you," "know their jobs," "friendly," and so forth.
4. The establishment, independent of the survey, by the staff members themselves of their

own qualitative standard of performance on key questions.

5. The staff's assistance in deciding on the questions to be asked.

6. The appointment of a hospital coordinating committee to plan staff and patient participation and to help interpret the data being collected.

The coordinating committee represented each of the professional disciplines in the hospital. It included the chief of one of the medical services and a consulting psychiatrist from the University of Washington Medical School, a representative from the Washington State Division of Vocational Rehabilitation, as well as the two authors of the survey, who represented the Department of Public Health and Preventive Medicine and the Washington Public Opinion Laboratory, University of Washington. The committee met once a month.

The medical director of the hospital sent a friendly letter to all patients, explaining the purpose of the study and telling them to consider the questionnaire as an opportunity to give their opinions in confidence without signing their names.

The 857 respondents answered 105 write-in, yes-or-no, and multiple-choice questions. Altogether there were some 140,000 coded answers, which the statistical division of the Seattle-King County (Wash.) Department of Public Health helped tabulate. The patients' comments about things liked and disliked added much useful information. The content analysis of the written comments was time consuming and delayed completion of the study, but these responses gave us the best insight as to how patients really felt about their hospital experience. The analysis of the study was completed in November 1954.

Responses to the Questions

The survey attempted to elicit from every patient his opinion about almost every phase of hospital experience, including his understanding of the ways in which the staff members were working toward his recovery. Questions were asked about such items as knowledge of the disease, medical treatment, nursing service, food, routines of care, physical environ-

Firland Sanatorium Rating Worksheet for Key Questions

(Seven sample questions)

To Staff Member: The purpose of these ratings is to establish criteria by which to interpret the responses of patients to selected questions in the patients' attitude survey. For each question below, fill in your best estimate of the percentage response that you would rate as a "poor" response and the percentages you would rate as "fair," "just acceptable," "good," and "very good" responses.

Key questions	What percentage response would you rate as—				
	Poor?	Fair?	Just acceptable?	Good?	Very good?
Do you think this hospital is run with your welfare at heart? Percent answering "Yes"-----	Less than --%	--% through --%	--% through --%	--% through --%	--% or more.
Do you feel this treatment here is helping you? Percent answering "Yes"-----	Less than --%	--% through --%	--% through --%	--% through --%	--% or more.
Is there much unnecessary delay in getting a report about your X-ray and lab tests? Percent answering "Seldom or never."	Less than --%	--% through --%	--% through --%	--% through --%	--% or more.
Do you feel you are getting good care? Percent answering "Excellent or very good."	Less than --%	--% through --%	--% through --%	--% through --%	--% or more.
Are your physical complaints (like headaches, etc.) taken care of satisfactorily? Percent answering "Always or often."	Less than --%	--% through --%	--% through --%	--% through --%	--% or more.
In general, do you think you get the nursing care you need? Percent answering "Always or mostly."	Less than --%	--% through --%	--% through --%	--% through --%	--% or more.
How often does your doctor have private talks with you? Percent answering "As often as necessary."	Less than --%	--% through --%	--% through --%	--% through --%	--% or more.

ment, patients' council, rating of traits of personnel with whom they came in contact, and special services such as occupational therapy, vocational counseling, and social service.

The patients rated high the skills and technical knowledge of the staff. They evidenced understanding of the communicable aspects of tuberculosis and of the importance of bed rest in its treatment. They admitted the inability to adjust to bed rest and indicated the extent of the inability. They revealed a lack of understanding of the functions of the medical social worker. They indicated that their chief worry was about plans for the future.

Patients tempered their criticisms of unsatisfactory experiences in the hospital with praise of other, highly satisfactory experiences. They

chose words expressing very high satisfaction or very low satisfaction when commenting about members of the hospital staff who did or did not show understanding of their problems or who did or did not treat them as individuals. Their comments and responses indicated concern about their need for more private talks with their physicians and expressed anxiety regarding delays in getting X-ray and laboratory reports.

Ninety percent rated Firland as a good hospital or one of the best tuberculosis hospitals. Only 10 percent rated their care as fair or poor. We were pleased to learn that 89 percent said that their families believed they were in the best place for care while they had tuberculosis.

Here are two examples of the closed-end ques-

tions we used and the percentage responses tabulated. In these questions, as in the other tabulations reported, the percentages mentioned are derived in each instance from the number of patients answering the questions:

Are you told ahead of time what changes there will be in your treatment?

	Percent
Always-----	35.5
Often-----	27.4
Now and then-----	18.1
Seldom-----	9.5
Never-----	9.5

Are your physical complaints (like headaches) taken care of satisfactorily?

	Percent
Always-----	51.9
Often-----	21.2
Now and then-----	18.3
Seldom-----	5.4
Never-----	3.2

Although 95 percent answering one of the closed-end questions indicated that a tuberculosis hospital was the place to go for treatment as well as to protect others from tuberculosis, only 61 percent in response to an open-end question about ways to prevent tuberculosis wrote clear-cut statements with correct answers such as: "Stay away from others, isolate the sick person." In another closed-end question indicating the degree of understanding about tuberculosis, 95 percent said it is possible to feel well and still have tuberculosis. In still another, only 86 percent recognized that tuberculosis does not always give warning in its early stages.

Comments written in by the patients covered a wide variety of topics. In the full report of the study, analysis of these comments are reported in detail (5). However some selected comments regarding the survey, the hospital, and care are as follows:

"This (meaning the survey) is the finest thing that has been done."

"If you would do more of this, we'd like it."

"This is a wonderful hospital—thanks for everything."

"The staff works out treatment in a fine way, but I believe the mental outlook of the patient is left entirely to chance."

"Good care—indifferent attitude—they feel

we are a pair of lungs in bed with absolutely no feelings whatsoever. Treatment and care conform too closely to an assembly line process."

"Care is excellent—personnel take sincere interest in my feelings and my care."

"My doctor always stops to report any news on tests and my condition and to check on how everything is going."

"I can understand that our doctors are too overworked to take time to explain, but that doesn't solve my problem of wanting to know about the progress or retrogression of my case. Wish something could be done about this."

"I know the nurses are busy, but can't we have better service at night?"

"Shortage of help makes us rush our routines until we are exhausted."

"Why can't we have our pajama tops ironed?"

"Try to get more movies—at least once a week."

Standards of Performance

Since we had no other study with which to compare the patients' reactions to their care, and yet we wished to make some kind of qualitative judgment about their responses, we asked some of the professional staff—mostly physicians, supervisory nurses, dietitians, and social workers—to experiment with us, establishing their own standards of performance in terms of patients' responses.

The staff selected 27 key questions which they thought would best reflect the patients' reactions to the care, treatment, and service the patient received from the professional and housekeeping staffs at the sanatorium. Next, the staff estimated on rating worksheets (see sample) the percentage of favorable replies which they thought would be evidence of poor, fair, just acceptable, good, or very good performance on their part. In this fashion, physicians, nurses, and some of the other members of the staff worked out estimated standards of performance for themselves as a group by a majority vote of the percentages they considered acceptable for each category.

The hospital coordinating committee selected the estimated percentage in the "good" category as the qualitative standard for each key question. Then for each key question, we compared

the actual percentage of favorable responses given by the patients with the estimated standard agreed upon by the majority of the staff as indicating "good" performance on their part. We also tabulated responses by wards so that the staff could see how their own wards performed.

"Do you know what the social worker can do for you?" a key question, is an example of how the actual responses compared with the estimated standard of good performance the social workers had set for themselves.

Percentage of patients checking "Yes," they knew what the social worker could do for them----- 48
Estimated standard of "good" performance----- 60

The social workers had estimated that a percentage response of 60 percent would indicate

Table 1. To the question, "How often does your doctor have private talks with you?" 423 patients (out of 749 answering the question) indicated by their written responses that they had private talks as often as necessary

Ward	Number of patients answering question	Respondents indicating that they had private talks as often as necessary	
		Number	Percent ¹
All wards.....	749	423	56
32-----	23	19	83
40-----	11	9	82
3-----	24	19	79
51-----	41	31	76
4-----	36	26	72
55-----	38	24	63
2-----	24	15	62
5-----	40	25	62
15-----	32	20	62
33-----	29	17	59
52-----	27	16	59
1-----	16	9	56
44-----	18	10	56
31-----	29	16	55
53-----	58	32	55
11-----	45	23	51
12-----	30	15	50
54-----	40	20	50
14-----	46	21	46
6-----	7	3	43
34-----	42	18	43
43-----	19	8	42
30-----	46	18	39
10-----	23	8	35
41-----	5	1	20

¹ Percentages are based on the number of patients answering the question in each ward.

a "good" standard of performance on the part of the social service staff.

Replies to the question, "Is there much unnecessary delay in getting a report from your X-ray and laboratory tests?" pointed up an area of dissatisfaction.

Percentage of patients checking "Seldom or never any unnecessary delay"----- 55
Estimated standard of "good" performance----- 75

The physicians had estimated that if 75 percent answered the question favorably, they (the physicians) would consider this evidence of "good" performance on their part. As it was, the replies showed that only 55 percent thought there was seldom or never any delay in getting reports. Only one ward met the physicians' standard in this respect, and written-in comments by the patients indicated their anxiety about delays in reports of X-ray and laboratory tests.

One of the questions which produced changes in administrative planning related to the satisfaction of having private talks with the doctors. When written-in responses to the question (table 1) were analyzed and tabulated by wards, we saw that the estimated standard was being met in only five wards. The overall responses showed that 56 percent of the patients felt they had private talks as often as necessary, but a 70-percent response had been agreed on as the estimated standard of good performance for physicians.

To Lessen Dissatisfaction

Of course, the reactions of the physicians varied. Some tended to belittle the significance of the study, saying that the criticisms didn't mean much, that the dissatisfied were probably influenced by some extenuating factor such as a neurosis or alcoholism. They called attention to the fact that 29 percent of the 299 irregular discharges in 1950 were classed as alcoholics.

Most of the physicians agreed, however, that the results of the survey reflected patient discontent in some measure and that the various criticisms should be answered by constructive changes in administrative procedures, and by serious consideration of the psychological factors which may be involved in the patients' reactions to certain administrative procedures.

The immediate problem was how to lessen discontent. To some it appeared that most of the areas of dissatisfaction could be eliminated by having the medical service institute a program of interviews for each patient in the doctors' conference room. The interview conference, they said, has been effective in teaching a patient about his own form of tuberculosis and about the disease in general.

The doctors proposed that the patient meet, shortly after admission and at frequent intervals thereafter, first with the chief of the service, the staff physician, resident physician, and then with the medical social worker, vocational counselor, chaplain, and any others on the staff, including nursing students, who might be able to help him understand his own case.

The patient's doctor would start the first conference by holding up the chest X-ray, explaining it in detail, pointing to the location of the disease, indicating the cavity, and so on. By encouraging inquiry about the implications of his own case, questions about the therapy—whether drugs and bed rest alone would control the disease or whether surgery might be necessary—the patient would be drawn into discussing his home problems, his future plans, his welfare. The hoped for result would be a gain in understanding for everyone.

The interview sessions have now been in effect

for 4 years. The program has been valuable in the day-to-day management of the patient. It supplies much of what each person in a tuberculosis sanatorium craves—a climate of helpfulness, a form of reassurance, and practical education about his specific form of the disease.

At present, the doctors' offices have been moved near the wards so that the doctors may have X-rays and charts close at hand and will be able to see patients every day if necessary. The change involved a reorganization in the filing arrangements and in the use of the clerical staff. It has made for a closer working relationship with the nursing staff on the wards.

Rating of Personal Traits

Our survey questionnaire gave every patient a chance to say whether he thought the doctors and others on the staff were uninterested or interested in his individual welfare. As a group, doctors, head nurses, nurses, orderlies and nurse aides, pantry maids, and ward maids and janitors were assessed by the patients in a 3-way rating of 10 personal qualities checked by each respondent. For example, for the trait "interested in you," the patient could check "often," "now and then," or "seldom" for each staff group. As with the standards of performance set for the 27 key questions, 7 of the personal

Table 2. Doctors and nurses as Firland patients saw them, percentage response, 1951 study

Quality	Doctors			Nurses		
	Often	Now and then	Seldom	Often	Now and then	Seldom
<i>Positive</i>						
Know their job.....	92	7	1	78	19	3
Try to get you to take a good cure.....	86	8	6	71	16	13
Friendly.....	83	15	2	76	20	4
Willing to listen.....	79	16	5	72	20	8
Can remember them smiling.....	78	18	4	71	23	6
Interested in you.....	75	19	6	57	30	13
<i>Negative</i>						
	Seldom	Now and then	Often	Seldom	Now and then	Often
Crabby.....	87	12	1	74	22	4
Unreasonable.....	85	11	4	80	17	3
Bossy.....	81	13	6	71	20	9
Show favoritism.....	75	15	10	68	20	12

traits were chosen for measuring good performance on the part of medical, nursing, and housekeeping personnel.

The prevailing opinion of the patients as to the personal qualities of doctors and nurses is shown in table 2 by the percentage of patients responding. For example, 92 percent of the replies indicated that these patients thought the doctors knew their job and 78 percent thought the nurses knew their job. The quality "interested in you" rated the lowest response for all personnel and rated 75 and 57 percent, respectively, for the doctors and the nurses.

During the 4 years since the study was made, there has been a gradual weeding out of the nurses, nurse aides, and others who were showing little interest in the patients. Also there has been serious discussion among the medical staff and nursing personnel regarding the importance of having the patient realize that they are "interested in him as an individual."

To assist with the educational program for patients and staff, a full-time professional health educator has been employed as of February 1956.

Some Other Improvements

Some of the changes in the hospital setting at Firland Sanatorium we attribute to the staff's seeing their own performance from the viewpoint of the patients, but there have been many other changes. Changes have been made in the administration of the nursing department, for which the orientation of all new staff members was revised. The nursing program has been adapted to the needs of different personnel on the staff. Some of the head nurses are assigned to smaller units to provide for better ward coverage, both during the day and at night.

All new employees and employees formerly assigned to night duty have an opportunity to work on the day shift. Classes in advanced procedures are held for selected groups of practical nurses assigned to evening duty, and review classes are held for practical nurses and orderlies. Additional assistant housekeepers have been employed in the housekeeping department to supervise the work of the janitors and maids. The laundry has benefited from

changes in personnel and from improved methods of handling lost articles. We now iron pajamas.

Changes made in the dietary department provide closer supervision of all foods checked out of the kitchen. Subordinate leaders are being developed from among the cooks, pantry workers, dishwashers, and counter girls. The relationship between the dietary department and the nursing and medical departments has been more clearly defined for ward personnel. On-the-job training is given to pantry girls for whom a special training manual has been developed also. Methods of keeping food hot, tasty, and attractive have been worked out and put into practice. We find we can serve coffee hot instead of lukewarm, a criticism that cropped up frequently among the questionnaire responses.

We now have movies every week.

It is not possible to recount all the changes that have resulted from the study. Some improvements no doubt would have come about because of the extensive use of chemotherapy in treating tuberculosis, reducing the average length of stay from 18 months to 8 months. Other improvements would have been expected from the staff's constant effort to lessen dissatisfaction and give the best possible care to each patient. We think we have made some progress in getting patients to feel that their physicians and nurses have a warm interest in their well-being, but such progress is hard to measure.

To whatever circumstance we attribute the changes, the discharges of patients against medical advice decreased from 44 percent of all live discharges in 1950 to 15 percent in 1954. To us this indicates that many of the factors causing dissatisfaction have been removed.

A Supplementary Study

A second study to refine our questionnaire and to ascertain the current opinion of patients about their hospital experiences was made in June 1955. In this second study we have attempted to design a questionnaire which can be used periodically, and for practical purposes it has been limited to about 65 items. As the research team worked on this second survey, two of the problems on which they have concen-

trated are (a) the problem of having staff members show more interest in their patients and (b) the need for better communication between physicians and nurses and between professional staff and patients.

During the early planning stage of the second study the five medical chiefs of service and the supervisory nurses voted to become active members of the research team rather than just members of the hospital coordinating committee. This made for an even closer relationship with the hospital staff than during the earlier survey. A staff member of the Anti-Tuberculosis League of King County, which contributed funds for publishing the first report (5), also is a member of the committee.

The results of our 1951 study have shown that Firland personnel have accepted an action study of their own behavior—a survey which involved themselves in its plan, conduct, and interpretation. Their willingness to take action on the findings, plus their ability to work together as a research team with the technical consultants, is in itself an accomplishment. The willingness to repeat the survey indicates an acceptance of

research methods to get at an understanding of dissatisfaction.

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Uterine Cancer Detection Studies

Eight cities have been selected for additional evaluation studies of the exfoliative cytology technique for detecting uterine cancer: Louisville, Ky.; Madison, Wis.; Detroit, Mich.; Charlotte, N. C.; San Diego, Calif.; Providence, R. I.; Columbus, Ohio; and Washington, D. C. Preliminary evaluation of the technique was conducted in Memphis, Tenn.

The new projects will begin as soon as arrangements are completed with sponsoring or cooperating local health and medical agencies, and each will continue for about 3 years. In some localities, the National Cancer Institute of the Public Health Service, will staff and equip local clinics and agencies; in others, grants will be made to support work that will be carried out entirely under local auspices.

A report of the study in Tennessee was presented in the April 1955 issue of *Public Health Reports*, p. 341.



Sanitation of Domestic Airlines

By WILLIAM H. MEGONNELL, M.S., and HOWARD W. CHAPMAN, B.S.C.E., M.P.H.

COMMERCIAL AIRLINES of the United States have achieved a notable degree of progress in cleanliness and sanitation.

Today's air passenger is provided many more comforts than were available in earlier aircraft. Airline companies properly insist that practicable passenger conveniences unquestionably contribute to the continued success of air

transportation. However, the installation of water systems, toilets, and galley facilities, such as are found on railway cars and ocean-going vessels (1, 2), is necessarily adjusted to the primary considerations of safety of the passengers and crew and weight and space conservation in all phases of airline operation.

The domestic scheduled airlines carried more than 32 million passengers in excess of 16 billion passenger-miles during 1954 (3). There was a tenfold increase in the number of passengers carried and the passenger-miles flown in the short span between 1942 and 1954. Nineteen scheduled lines operated 186 aircraft in 1942. Twelve years later there were 32 lines with 1,175 craft. Comparable figures are not available for nonscheduled lines, but their growth probably paralleled that experienced by the regular airlines.

Mr. Megonnell, at present doing graduate work in public health at Harvard University, is a sanitary engineer in the Division of Sanitary Engineering Services, Public Health Service. He is co-author, with E. C. Garthe, of Dining Car Sanitation in the United States, published in the January 1955 issue of Public Health Reports (p. 25).

Mr. Chapman is co-author, also with Mr. Garthe, of Sanitation Aboard American Flag Vessels, which was published in October 1952 (p. 963), and was the first of the articles on the carrier-inspection functions of the Public Health Service. Mr. Chapman is Public Health Service regional engineer for Region IV (Atlanta).

Public Health Significance

All parts of the world can now be reached by air within the incubation period of the major infectious diseases.

Obviously, the rapid development of long-range air transportation is a source of much concern to public health authorities. It is the Federal Government's responsibility to institute protective measures aimed at preventing the introduction, transmission, or spread of communicable diseases from foreign countries to the United States, and in this country, from one State to another. When the Congress granted interstate quarantine authority to the Public Health Service in 1893 (4), however, only balloonists traveled by air.

The Service devoted little attention to the matter of airline sanitation until the early 1940's. In wartime, as swift transportation became vital to national survival, servicemen and defense workers took to the air in unprecedented numbers. To provide public health workers and carrier employees with necessary information and guidance in conforming to the Interstate Quarantine Regulations (5), the Service in 1942 published the Sanitation Manual for Land and Air Conveyances Operating in Interstate Traffic (6). Limited association with the airline industry up to that time and relatively long experience in railroad sanitation made it inevitable that the Service base the manual largely on land-carrier operations.

Before the war, the largest commercial airliner seated 21 passengers. The longest flight was approximately 800 miles and required about 4½ hours of flying time. After the war, the commercial airlines converted a number of military aircraft into passenger planes, designed to carry from 40 to 50 passengers on flights of several thousand miles. Subsequently, faster planes with additional passenger capacity were built.

The use of larger and faster conveyances results in two important factors of public health significance: (a) The carrying capacity creates in proportion the need for food, water, and beverage containers, wash water tanks, and toilet facilities, and (b) speed and flight range shorten the travel time between endemic disease areas and areas susceptible to infection. Airline personnel were applying to their sanitation problems the ingenuity typical of the industry, but there was little or no standardization of equipment or uniformity of operation among the carriers. The possibilities of disease transmission

That Ridiculous Pork Chop

"I had a pork chop at a height of 8 miles above the earth's surface. . . . Find yourself slipping through space in a comfortable armchair at just under 500 miles per hour, your hat in the rack above your head and the nearest point of the earth's surface some 40,000 feet below you; it is hard to think of anything that could make you more acutely sensible of your singular situation. But a pork chop does it. Sizzling hot from the galley they brought it to me, and I looked at its homely outline and then out along the steady, silver wing into the deep blue dome of the sky, and I thought of the pitiless sub-sub-zero unbreathable air in which we hung and the long, long drop below—and then I looked back at my plate again and somehow, suddenly, the whole sweep and sublimity of man's miraculous achievements seemed to be summed up and crystallized in that ridiculous chop. What business had such a thing to be 8 miles up in the air? . . . It tasted—and I remember being surprised at that, too—much as usual."

—From H. F. ELLIS, *Meals in Motion*,
The Atlantic, August 1954, pp. 93-95.

together with the growth of the air transport industry made apparent the need for a comprehensive handbook devoted exclusively to standards of interstate airline sanitation.

To meet this need, the Service published the Handbook on Sanitation of Airlines in 1952 (7). The Joint Committee on Airline Sanitation, a committee composed of caterers and representatives of the airlines associated with the Air Transport Association of America, collaborated closely with the Service in the preparation of the text. Representatives of other airlines and many State health departments reviewed the preliminary draft.

The publication sets standards on all facets of interstate airline sanitation for domestic air carriers. United States airlines operating in foreign traffic follow the same standards, whenever practicable, in their overseas operations.

The handbook is intended for the use of designers, builders, caterers, and servicing area personnel as well as operators of aircraft. Some day it may serve to stimulate the formu-

lation of comprehensive international standards since sanitation, in common with other phases of airline operation, has universal application and importance.

Airline Food Service

In their efforts to attract and hold new business, aircraft operators vie with each other to provide tasty, attractive meals for passengers. This culinary spirit is probably not so keen in the United States as it is in other countries, where planes on epicurean flights at times go out of their way to provide time aloft for the eating of meals. Nevertheless, domestic scheduled airlines today are spending more money to feed their passengers than they spent not many years ago to fly them. The cost for complimentary meal service on scheduled airlines in 1954 was more than \$22 million.

Overseas airlines are often equipped with galleys for the storage and preparation of pre-cooked frozen foods. This type of service on domestic airlines is precluded by weight, space, and flight-time restrictions.

Foods and beverages for domestic aircraft are prepared in catering establishments or carrier-owned commissaries. Airline catering has become a specialized trade. Airline equipment has been devised for the packing, storing, and transporting of meals. As a precaution against contamination of food and drink from the time the meals are prepared to the time they are served aboard the plane, lightweight and compact mechanical refrigeration units have been developed for aircraft.

Meats, cooked vegetables, and other hot comestibles are placed in casseroles, where they are kept hot either in large, preheated vacuum jugs or in portable, electrically heated ovens.

Cold portions of meals, such as salad dressing, bread, butter, dessert, cream, and condiments, along with utensils and napkins, are placed on trays which are packed in carrying cases, with dry ice.

Beverages are stored and transported in stainless steel, constant-temperature containers, which often are chilled by dry ice placed in a recessed tube in the lid of the container.

After the meal, unconsumed foods and soiled utensils are returned on the individual serving

trays to the carrying cases. Liquid and paper wastes are put in covered or enclosed metal receptacles. Tray carriers and waste containers are removed by catering personnel for emptying and cleaning, prior to re-use on later flights. Suitable refuse containers, storage areas, and container-cleaning facilities must be provided at the catering point.

It is not feasible to clean and destroy microbes on multi-use eating and drinking utensils aboard aircraft, where water supplies and waste retention facilities are restricted by space and weight allowances. Since washing is necessarily performed at ground installations, enough utensils are needed on the craft to give each passenger a clean set.

Preventing Food Contamination

There has been a strong cooperative effort directed against the contamination of food. Galley equipment is designed to facilitate cleaning by the aircraft operator in compliance with food sanitation standards. Rounded corners, tight seams, and removable parts aid in preventing accumulation of dirt and harborage of vermin. Unless design and construction are combined with proper cleaning and maintenance,



Foods and beverages are delivered in enclosed carts.

nance, insects and rodents may be attracted aboard aircraft by remnants of food in the cabin and in the galley area (8).

Despite precautions, few operating airlines have escaped at least one outbreak produced by food contamination although outbreaks reported have been relatively minor, both as to number of cases and seriousness (8, 9).

Symptoms often develop within a short time after swallowing contaminated food. Unquestionably, a pilot suffering from severe nausea, vomiting, headache, diarrhea, or cramps would be strained to assure the safety of his plane, passengers, and crew. Thus, although the primary aim of sanitation is to prevent the spread of communicable disease, an immediate benefit of the program is to enhance safety by protecting the health of the pilots.

Serving of box lunches on commercial airlines has increased with the advent of tourist flights. Box lunches often are served during military movements and other chartered flights. Foods usually included in box lunches are particularly vulnerable to contamination. Aircraft have no equipment for keeping box lunches hot or cold to retard bacterial growth. The selection of food for a box lunch and its management require unusual consideration.

Two violent outbreaks which occurred simultaneously on planes of two domestic airlines in 1954 were traced to box lunches prepared by one caterer. Both outbreaks affected military personnel on charter flights.

Also in 1954, several crew members and about half of the passengers became violently ill aboard a United States plane operating in foreign traffic. Fortunately, the plane was returned safely to a stopover point. There the sick were hospitalized. Sandwiches served on this flight had been prepared at a foreign station and were found to be grossly infected with staphylococci.

Alerted by these experiences and aware of the inherent dangers to health in box lunch food service, the Joint Committee on Airline Sanitation sought the recommendations of the Service in preparing a specific sanitary guide for the safe preparation, storage, and handling of box lunches. The result was the Guide to Safe Airline Box Lunch Service, which the committee has recently issued to all airline caterers.

The prolific growth of pathogenic organisms in box lunches is generally attributable to inadequate refrigeration or lack of refrigeration. Recently, several catering chains have purchased portable, insulated, mechanically refrigerated carts in which to store lunches and transport them to the points of sale.

Aircraft Water Supply

The availability of safe, potable drinking water is no less important in the plane at 10,000 feet than it is at ground level in the cities and towns. Concern over the quality of drinking water prompted intensive activity in airline sanitation.

Bacteriologically unsatisfactory drinking water samples in alarming proportions were collected from aircraft in 1951. Extensive water sampling and bacteriological examinations revealed the condition to be widespread. Airlines, caterers, and the Public Health Service agreed that the observations pointed clearly to the need for close attention to sanitation, not only of drinking water supplies but of all aspects of airline operation.

Corrective measures were introduced without delay. Immediate action consisted of establishing continuous procedures for the detection and repair of structural flaws which develop through usage in portable water containers and for careful cleaning, filling, storage, and handling of the containers. Manufacturers were urged to improve the design of equipment to conform with sanitary construction standards.

Drinking water is usually supplied in 2-quart, 6-quart, or 8-quart stainless steel, constant-temperature containers, which are filled at catering establishments. The largest containers have recessed tubes, built integrally with the lids, into which ice can be placed for chilling the water. The apparent simplicity of this procedure belies the serious problems encountered by airlines in providing safe, palatable water.

Except in certain large planes, wash water is supplied from a separate system. This is usually of rudimentary design, consisting of a tank in, or near, the toilet room and a short length of pipe through which water flows by gravity to the draw-off point at the lavatory sink.

On older craft, the tanks are filled from buckets. The tanks on newer planes are filled by pumping water from a movable cart.

Waste water is discharged directly overboard from older aircraft. On pressurized planes, waste water generally is stored in retention tanks so as to avoid the complicated airlocks or similar devices which would be necessary to prevent pressure loss.

Indications are that the entire general system for supplying drinking water on domestic aircraft will be revised in the future.

Single Water Systems

The history of unsatisfactory bacteriological quality of drinking water in many constant-temperature containers, the extra handling involved, and the constant vigilance necessary to prevent chance contamination of the water when portable containers are used led the Public Health Service to advocate the installation on aircraft of single water systems which supply potable water for drinking, washing, and all other purposes. Single water systems are to be found on some air conveyances operating in international traffic, on some foreign aircraft, and on some planes of one domestic operator.

The many technologic problems to be considered in designing a satisfactory and sanitary water system for aircraft are complicated by space, weight, and safety considerations. In view of weight limitations, the amount of water permitted is small. However, water may be even more necessary aboard planes than it is on surface carriers because of the problem of maintaining ground temperature and humidity conditions in passenger cabins at operating heights (8, 10).

Cumberland and Bowey (10) report the experience of British Overseas Airways Corporation, which might be considered in estimating water supply requirements on United States flights. On BOAC planes, 3.75 pounds of water per passenger has been found to be adequate for drinking and washing purposes on flights of 1 to 3 hours' duration; 6.88 pounds for day flights; and 9.38 pounds for night flights of 3 to 5 hours. Ten pounds per passenger is provided on flights from 5 to 12 hours long.

Comparable information on United States



Filling an aircraft water system at stopover point.

flights is not available. However, McFarland (8) estimates that the average water intake for a passenger on an air transport is about 1.4 pounds during each 6 hours of flight. Since one-half of this amount would be available in the food served aboard the plane, it would be necessary, if food is served, to provide only 0.7 pound of drinking water per person for a 6-hour flight.

Estimates of the amount of water required for washing are more variable. On large aircraft, the supply ranges from 5.0 to 6.7 pounds a person. United States transoceanic airlines supply at least 10 pounds of drinking and washing water for each person on overseas flights of approximately 12 hours.

These seemingly small water requirements account for a significant weight increment in larger craft. The problem has stimulated research on the possibility of recovering water by various means during flight. Water recovery from engine exhaust gases, reclamation of used ablution water, and recovery of water vapor condensate within the aircraft have been investigated as possibilities. Up to now, each of these leads has proved unsatisfactory because of engineering, hygienic, esthetic, or safety implications.

Design of Water Systems

Aircraft water systems in the past were designed after other equipment layout was completed. As a result, the amount of leftover space available determined the size, shape, and location of tanks, complicated their accessibility, and invited possible contamination. If the space for water tanks is allocated during the early design stages, the water system can be planned in relation to the entire plane and its intended use.

As with other engineering developments, simplicity generates dependability so that a well-designed water system is free of unnecessary, complicated parts which require maintenance and which are subject to breakdown. Simplicity makes the gravity-feed system desirable, but inflexibility of tank location sometimes makes it impracticable. Since there is usually little room in the roof of a passenger cabin to install tanks in keeping with the decor, it is often necessary to install an electric pump or other force type of feed which does not limit the tank size and location.

Sanitary design requires that the water tank have no interior cracks, open seams, or protuberances which might provide harborage for contaminants. Careful choice of materials for tanks can prevent subsequent corrosion as well as possible contamination of the water with metal salts which may be harmful to health or unpleasant to taste or smell. Equal care given to the selection of any required protective coatings will prevent possible toxic effects.

Prevention of freezing is the principal difficulty in assuring trouble-free installation of aircraft water systems. Direct contact between the fuselage skin and the water system is avoided by proper location or insulation of tanks and pipes. A completely drainable system which can be emptied easily may escape damage when the plane is standing idle in freezing weather. It is easy also to flush such a system periodically.

Sanitary design requires a distribution system protected against the introduction of contamination by backflow. A vacuum breaker should be installed in the supply line when the water delivery to fixtures is not through an air-gap.

Water drawn from any tap on the water system of an aircraft should be fit for human consumption, but it takes careful planning and good maintenance to adhere to this standard.

According to the Interstate Quarantine Regulations, water must be safe in quality and handled in a sanitary manner before it is considered acceptable for use aboard carriers. Therefore, the use of strainers or filters in aircraft water systems is not required by the Public Health Service.

When filtering devices are provided aboard aircraft, the Service recommends that they be easily accessible and so constructed that they can be cleaned and sterilized or replaced with sterilized units routinely. Otherwise, filtering devices tend to harbor bacteria. Sometimes use of the filter promotes a false sense of security to the extent that cleaning and sterilization are neglected.

Similarly, treatment of water aboard air conveyances is not required. However, a carrier's decision to practice supplemental treatment may be an added safeguard.

Along the international airways, there is interest in design of the water-servicing panel on the skin of the ship.

If the panel is opposite to the sewage and other servicing panels, there is less possibility of contaminating the water during the filling operation. This possibility is reduced still further when the water panel is clearly labeled and protected from dirt, oil, and other contaminants by a hinged cover. Connections should be quick-coupling and of a size different from other connections. They should be fitted with tight-sealing caps, with keeper chains.

As airports lack hydrants on the ramps, water is usually transported to aircraft in carts. The Service recommends that these be of sanitary design, cleaned routinely, clearly labeled, and used for no purpose which could affect the quality of the water. A direct hose connection from a hydrant to the aircraft water tank would, of course, minimize water handling and chance contamination.

Aircraft Sewage Disposal

Commercial airlines rightly insist that toilet facilities on the planes be adequate, convenient,

Sewage Disposal on a Modern Airliner



Left: Compact toilet room. Above: External servicing panels with waste water valve and drain (left) and sewage outlet, flushing water inlet, and valve. Right: Large hose drains sewage into cart beneath plane. Small hose pumps flushing water and deodorant into toilet.



and inoffensive. Consequently, the design and installation of sewage facilities are now facets of the aeronautical sciences (11).

Both Interstate Quarantine Regulations and the International Sanitary Regulations (12) prohibit the discharge of excrement from aircraft in flight. None of the methods investigated for rendering sewage innocuous prior to disposal overboard have proved satisfactory from medical or engineering viewpoints (8, 11, 14). Sewage is stored aboard the plane pending disposal at servicing areas.

Present weight and space limitations preclude the provision for flushing water and storage tanks. A system employing waste wash water for toilet flushing, built into a few airplanes, was later removed because of operating difficulties.

On older aircraft a chemical toilet retains sewage wastes, and a small amount of deodorant-disinfectant solution is placed in a carry-out pail, housed in a vent chamber.

At the airport, a maintenance man carries the bucket through the passenger cabin to a cart or truck to be emptied into a sewer. The bucket is cleaned inside a closed cabinet connected to a sewer, recharged with chemical solution, and returned to the plane.

On newer planes, however, the toilet-servicing panel is recessed in the skin of the fuselage. The panel contains a waste discharge outlet, a

flushing-water inlet, and valves. Couplings—a different size from the water couplings—permit easy attachment and release of hoses. Servicing pipes are sealed with removable blanking caps. Connections are tight to prevent leakage.

A crew empties the sewage by gravity flow through a large flexible hose into a cart or truck, flushes the aircraft sewage container with water from the cart or an auxiliary cart, and pumps fluid chemical into the toilet tank for recharging.

The carts with waste-receiving, flushing-water, and deodorant tanks for ground servicing are maintained separately from drinking water and food service equipment, by a separate crew.

Sewage Retention Capacity

The sewage retention capacity of toilet tanks depends on the number of passengers carried and the duration of the flight. For design purposes, the rate of body waste production per hour per person is estimated at from 0.014 to 0.019 gallon. Dejecta from airsick passengers is not overlooked in estimating waste retention capacity of toilets.

The volume of tanks is increased commensurately with seating capacity and length of flight.

Rounded corners and smooth seams and joints facilitate cleaning of toilet tanks. With ex-

ternal servicing, it was necessary to introduce valves, piping, and other fittings into the containers.

Odor Control, Incineration

Although odor-destroying substances are used in aircraft sewage retention tanks, the Public Health Service does not accept their use in lieu of effective cleaning. The product used must suppress sewage odors for prolonged periods over a wide range of temperatures, but it should not be a nuisance or a danger to the passengers or craft. It is important that it not mask odors of leaking gasoline, hydraulic fluid, oil, smoke, or other danger signals normally detected by the sense of smell.

It is required that the toilet room and galley be as distant from each other as possible. Vitiating air from toilet rooms is discharged overboard rather than recirculated in the plane's air-conditioning system. This system of ventilating is effective during flight, but not always at stopover points and terminals.

The airtight, watertight receptacle used by airsick passengers for containers should likewise be widely separated from the galley.

Current research and development appear to be concentrating on incineration of sewage and dejecta while the plane is in flight. An electric incinerator has been developed, but its power requirements may be excessive for present aircraft. Incineration by fuel or electricity is complicated by safety considerations.

Other Health Services

As with vessels and railroad passenger cars, the Public Health Service awards Certificates of Sanitary Construction for aircraft constructed in compliance with requirements of the Interstate Quarantine Regulations. Review of plans and specifications concerning features with health significance assures that defects which might require subsequent costly changes are not built into a plane. It is becoming general practice for carriers to specify that the manufacturer must obtain the certificate before delivery of a conveyance will be accepted.

To assure compliance with the Interstate Quarantine Regulations relating to the sanitation

of food, water, milk, and frozen dessert supplies, a continual program of inspection is conducted in cooperation with State health departments. Subsequent to each inspection, a source is classified as approved, provisionally approved, or prohibited for use by interstate carriers.

Airlines are kept informed of the sanitary status of suppliers by the semiannual publications, the Official Classification of Airline Catering and Watering Points and the Official Classification of Milk and Frozen Dessert Sources.

Approximately 200 servicing areas are regularly inspected. Plans for construction or major reconstruction of terminal facilities are reviewed when public health is concerned, and inspection and consultation are continued during construction.

Public Health Service and State and local health department technicians are prepared to investigate disease outbreaks occurring on aircraft.

Service personnel of the regional offices are prepared to instruct airline employees in airline sanitation, to assist in developing visual aids and other educational material, and to interpret regulations for carriers as an aid in the formulation of company rules governing airline employees.

Service studies and investigations relating to airline sanitation are conducted to assure that equipment is designed and fabricated in accordance with standards and requirements of the Interstate Quarantine Regulations.

Problems faced by United States airlines which operate overseas are particularly perplexing. Most of these lines attempt to follow the standards established for interstate travel in the Handbook on Sanitation of Airlines. They conscientiously try, by the most appropriate means, to load only acceptable food, milk, and water supplies, and to provide adequate facilities and operating procedures for the safe and sanitary disposal of sewage and refuse. Their efforts, nonetheless, are greatly complicated by local customs, illness among native workers, and public health practices which are not consistent at all stations.

Aircraft sanitation services are fitting items for international standardization. The Public

Health Service standards are a contribution toward attainment of this objective.

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NOTE: The photographs have been supplied through the courtesy of American Airlines, Pan-American World Airways System, Sky Chefs, and Allied Aviation Services.

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PHS Staff Announcement

Abraham W. Fuchs, chief of the milk and food program of the Public Health Service from 1940 to 1952, retired on March 1, 1956, after 39 years with the Service, 26 of them as an engineer officer of the commissioned corps.

For the past year, Mr. Fuchs has been chief of the Field Party, United States Operations Mission, Kingston, Jamaica. He has returned to Jamaica as an adviser on environmental sanitation for the International Cooperation Administration.

In a distinguished career with the Public Health Service, Mr. Fuchs helped State and local agencies to develop milk and food sanitation ordinances and codes and to initiate cooperative programs with industry for the improvement of the sanitary quality of milk supplies. During World War II, his atten-

tion was directed toward adequate milk supplies for critical defense areas and demonstration classes for food handlers. His research focused on sanitary design and adequacy of pasteurization equipment. He developed basic design criteria for leak-protected valves on vat pasteurizers.

From 1952 to 1955, Mr. Fuchs was chief of the Health Division, United States Operations Mission to Israel. The Association of Milk & Food Technology awarded him its citation award last October. He had served as an associate editor of its journal since 1947, as president of the association in 1949, and as a member of the executive board for 6 years.

Mr. Fuchs obtained his civil engineering degree with a major in sanitary engineering at Cornell University in 1913.

Third Antibiotics Symposium

These are abstracts of a few papers from the third annual Symposium on Antibiotics, held November 2-4, 1955, in Washington, D. C., under the sponsorship of the Food and Drug Administration and in collaboration with the journals, *Antibiotics and Chemotherapy* and *Antibiotic Medicine*. Eleven concern penicillin V. Three deal respectively with antibiotic therapy of sleeping sickness, venereal diseases, and virus diseases.

The proceedings of the symposium have been published in the *Antibiotics Annual, 1955-1956*, issued by Medical Encyclopedia, Inc., 30 East 60th Street, New York 22, N. Y.

Antibiotics in the Treatment of Virus Diseases

The role of antibiotics in the treatment of bacterial diseases has been fairly well delineated. With respect to virus diseases, however, the role of antibiotics still greatly needs clarification.

Four factors contribute to the problem:

1. Accurate diagnosis is difficult, and antibiotics are used on the chance that a particular illness may be of bacterial rather than of viral origin.

2. Confusion arises from the classification of Chlamydozoaceae with the true viruses.

3. A widespread belief prevails that antibiotics will at least be useful in preventing secondary bacterial infection.

4. There is an unjustified assumption that "at least antibiotics can do no harm."

Evidence suggests that the use of antibiotics may actually delay recovery in the following diseases: influenza, the common cold, herpangina, poliomyelitis, measles, and mumps.

Smallpox, chickenpox, and herpes zoster are virus diseases in which antibiotics may be helpful because of their effects upon secondary bacterial infection.

The need for further controlled studies is stressed.

—BARBARA MOULTON, *Division of Medicine, Food and Drug Administration, Washington, D. C.*

Erythromycin Therapy of Venereal Diseases

Although penicillin is the antibiotic of choice in therapy of most venereal diseases, the increasing incidence of hypersensitivity to this agent necessitates that other antibiotics be evaluated for their efficacy in treating venereal diseases in patients known to be sensitive to penicillin. Erythromycin was selected because its in vitro activity most closely parallels that of penicillin.

Initially, consecutive patients received erythromycin by mouth. The majority had gonorrheal urethritis. Of 132 patients receiving a total dosage of 0.8 to 1.2 gm., good clinical results were obtained in 114, indifferent in 10, and poor in 8. Fewer cases of nonspecific urethritis and chancroid were available. The results with much larger doses were not striking. The bacteriological results in the cases of gonorrhea were in close agreement with the clinical results.

Another group, all of whom had gonorrhea, received 100 to 200 mg. of erythromycin intramuscularly. Of the 88 patients studied, good clinical results were obtained in 77, indifferent in 5, and poor in 6. More detailed analysis of these data reveals the best results to be in those receiving larger doses.

It appears that erythromycin is a satisfactory substitute for penicillin, especially when given intramuscularly in adequate dosage.

—THOMAS H. HAIGHT, *department of medicine, University of Oklahoma School of Medicine and University Hospitals, and the Prevention and Control Center, Oklahoma City.*

Stylomycin in Human Sleeping Sickness: 17-Month Followup

Fifteen cases of sleeping sickness (*Trypanosoma gambiense*) were treated with stylomycin (puromycin) for 7 to 10 days. The daily dosage used was 1 to 2.25 gm., the total per patient ranging from 9.5 to 13.5 gm. Clinical diagnosis was confirmed by blood cultures (Weinman's medium modified by Henraard and Peel as recommended by Neujean and Evans), cerebrospinal examinations, and microscopic examination of material from the lymph glands. Periodic controls were carried out in the same manner.

Before treatment, material aspirated from the lymph nodes of all patients showed trypanosomes, all spinal fluids were abnormal, and 11 patients yielded positive blood cultures. At the last control, 17 months after treatment ended, 10 patients were negative, 4 relapsed during the first 6 months, and 1 presented

abnormal spinal fluid without any other laboratory sign of the disease.

—CARLOS TRINCAO, ALMEIDA FRANCO, ALFREDO NOGUEIRA, A. R. PINTO, and HEINZ MUHLFFORDT, *Kumamoto University Medical School, Honjo-machi, Kumamoto shi, Japan.*

PENICILLIN V

Blood Concentrations Following Oral Administration and Comparison With Penicillin G

Penicillin V acid in tablet and capsule forms and benzathine penicillin V as tablet and oral suspension have been administered orally to a large number of human subjects. The penicillin blood serum concentrations were determined 1, 2, 4, 6, and 8 hours after a single dose. Crystalline penicillin G potassium or benzathine penicillin G in similar dosage forms were also tested. Tablets or capsules containing 200,000 units of penicillin V acid produced significantly higher blood concentrations than comparable penicillin G preparations. The highest initial blood concentration was given by penicillin V acid capsules 1 hour after administration. Thereafter, the capsules and the tablet formulation gave the same penicillin blood concentrations.

The average concentration of penicillin in the serum 1 hour after the administration of penicillin V acid tablets was 0.884 unit per milliliter, while potassium penicillin G tablets gave only 0.578 unit. Penicillin V acid in capsules given to 50 subjects yielded an average blood concentration of 1,098 units per milliliter 1 hour after administration, while potassium penicillin G in capsules gave only 0.699 unit. The duration of the penicillemia was the same for both penicillin V and penicillin G in either dosage form. Detectable penicillin blood concentrations were found in more than 80 percent of the subjects for 4 hours, and in about 40 percent for 6 hours with either penicillin V or G.

An increase of two and one-half times in the dose of penicillin V acid in tablet form gave proportionately higher blood concentrations at

all times tested. This was accompanied by an increase in the percent of positive blood samples taken at 6 and 8 hours after a single dose. A twofold increase in the amount of penicillin V acid in capsule form gave proportionately higher blood concentrations 1 hour after administration and slightly higher after 2 hours and 4 hours. Thereafter, the penicillin blood concentration did not increase above that of the lower dose. The number of subjects showing a penicillemia at this higher dosage was the same as that for the lower dosage with the possible exception of the fourth hour, where the difference between the lower dose and the higher dose rose from 82 to 100 percent positive.

Benzathine penicillin V, both tablets and oral suspension, produced significantly higher blood concentrations than comparable doses of penicillin G for the first 4 hours. Thereafter, benzathine penicillin G gave significant penicillin concentrations for 6 to 8 hours in 50 percent of the subjects, while benzathine penicillin V blood concentrations gave only 10 percent positive after 6 hours and were substantially negative after 8 hours.

—LAWRENCE E. PUTNAM, WILLIAM W. WRIGHT, and HENRY WELCH, *Division of Antibiotics, Food and Drug Administration.*

Blood Levels in Patients Receiving Oral and Intramuscular Penicillins: 24-Hour Study

This study, at the Robert W. Long Hospital, Indiana University Medical Center, was designed to compare blood levels of penicillin V with penicillin G and aqueous procaine penicillin G.

Six patients were given penicillin G in capsules, 400,000 units orally at 0, 6, 12, and 18 hours. Penicillin blood levels were determined at intervals.

After 2 days, the procedure was repeated using the same unit dosage schedule with penicillin V capsules.

Forty-eight hours later, the six patients were given one intramuscular injection of aqueous procaine penicillin G, 400,000 units, and again penicillin blood levels were determined at intervals.

The blood levels of penicillin V compared favorably with the other two penicillin preparations.

—WILLIAM E. SYMON, *Indiana University Medical Center, Indianapolis.*

Comparative Clinical Laboratory Studies: Penicillin V and Penicillin G

Thirty healthy, ambulatory subjects were given equal amounts of penicillin V or penicillin G orally. The material was ingested in the fasting state and following a standard meal. Blood penicillin concentrations were determined at intervals for 8 hours, using a twofold tube dilution technique. When concentrations of penicillin V and penicillin G were compared directly, whether the subject was fasting or not, early levels with penicillin V were achieved which were maintained higher and longer than with penicillin G. Analysis of the data expressed as total penicillemia per 8-hour period revealed that with or without food, penicillin V produced greater blood penicillin concentrations than did penicillin G. There was only a 16-percent difference in penicillin V concentration when it was given fasting or with food. Penicillin V in the fasting state also produced a 61 percent greater concentration than did fasting penicillin G. Penicillin V given with food showed a penicillemia 224 percent greater than penicillin G taken with food. Furthermore, even when penicillin V given with food was compared to penicillin G in the fasting state, 38 percent greater penicillemia values were obtained with penicillin V than with penicillin G.

—FRANKLIN B. PECK, Jr., and R. S. GRIFFITH, *Lilly Laboratory for Clinical Research, Indianapolis Hospital, Indianapolis.*

Effectiveness in Acute Gonorrheal Urethritis

Advantages inhere in both oral and parenteral medication. The choice depends upon the circumstances at hand. The advantages that an oral preparation of penicillin offers over the intramuscular injection are primarily those of convenience and a decreased possibility of sensitization or allergic response. There is therefore

a need for an oral preparation of penicillin, one that will not be destroyed by the gastrointestinal pH and that will be readily absorbed, giving adequate body fluid and tissue concentrations.

Penicillin V (phenoxymethyl penicillin) is such a preparation and it has been reported to be effective in the treatment of certain diseases caused by penicillin-susceptible organisms.

The results obtained to date in our experience with a small number of patients, summarized below, indicate that 1.8 million units is the minimal dose for use in this infection and that a somewhat higher dose may be more effective.

Total dosage (units)	How administered	Num- ber of patients	Cures	Fail- ures
800,000	400,000 twice daily	5	0	5
1,200,000	800,000 initially	4	1	3
	400,000 at 6 hours			
1,200,000	400,000 thrice daily	3	1	2
1,800,000	600,000 thrice daily	10	8	2

It appears, therefore, that penicillin V administered orally may be used in treatment of gonorrhea. The study, the methods and procedures of which have been described elsewhere, is being continued.

—MILTON MARMELL and AARON PRIGOT, *Departments of Pathology and Surgery and Department of Hospitals, New York City.*

Pharmacologic and Toxicologic Studies

Penicillin V (phenoxymethyl penicillin) has been shown to be more acid resistant and to produce higher blood levels after oral administration in human test subjects than penicillin G. Studies in laboratory animals have proved the safety of penicillin V and have confirmed the increased absorption and blood levels.

The acute toxicities of penicillin V, sodium penicillin V, and sodium penicillin G have been compared following administration to mice by several routes. The LD_{50} 's \pm standard error in milligram per kilogram were: for penicillin V, intraperitoneally $1,351 \pm 68$, subcutaneously and orally greater than 4,000; for sodium penicillin V, intraperitoneally $2,281 \pm 74$, subcutaneously $2,440 \pm 66$ and per os greater than 4,000; and for sodium penicillin G, intraperitoneally $3,314 \pm 146$, subcutaneously and orally greater than 4,000.

Rats fed diets containing up to 2 percent penicillin V for 2 months gained weight and showed no visceral or hematopoietic damage. Dogs that received daily doses of 200 milligrams per kilogram for the same period also remained normal.

In dogs, the renal clearance was slightly lower for penicillin V than for penicillin G. The secretion of penicillin V by the renal tubules was inhibited by probenecid. Penicillin V was bound by plasma protein to about the same extent as penicillin G.

Blood levels have been determined in several species of experimental animals following oral administration. Penicillin V produced higher levels than penicillin G in most instances.

—ROBERT C. ANDERSON, C. C. LEE, H. M. WORTH, and K. K. CHEN, *Lilly Research Laboratories, Indianapolis.*

In the Treatment of Subacute Bacterial Endocarditis

Three cases of subacute bacterial endocarditis (two due to alpha hemolytic streptococci and one due to *Neisseria sicca*) were treated with oral penicillin V. The dose was two million units every 4 hours.

Penicillin V blood levels (*Sarcina lutea* cup-plate method) ranged between 5.6 and 20 units per milliliter of serum.

One patient was treated for 42 days with a total of 508 million units of penicillin V with clinical and bacteriological remission.

Two of the three cases exhibited clinical relapse after 1 week of treatment. In both cases multiple blood cultures remained sterile. The addition of streptomycin (2 grams per day) to the therapeutic regimen resulted in remission.

No untoward reaction to penicillin V at this dose level was encountered.

—E. L. QUINN, J. M. COLVILLE, F. COX, and J. TRUANT, *Infectious Disease Clinic, Henry Ford Hospital, Detroit.*

Inactivation in Tissues and Body

All of the administered penicillin does not appear in urine. Loss is mainly due to inactivation in tissues, especially the liver, with de-

pendence on metabolism (Clowes and others). Inactivation of penicillin G (benzylpenicillin) and penicillin V (phenoxymethyl penicillin) was examined on liver slides of guinea pigs, using the Warburg apparatus. Inactivation was found to be anaerobic and aerobic, increasing with the amount of penicillin concentration. Investigations with activators, inhibitors, and metabolites show that there is an adaptive ferment which is built up under the influence of penicillin and with use of metabolic energy.

—K. H. SPITZY, *University Clinic, Vienna, Austria.*

Serum Penicillin Concentrations Following Oral Administration

Capsules containing 200,000 units of penicillin V and commercial 200,000 and 500,000 unit tablets of penicillin G were administered with respect to meals to adults with no evidence of cardiac, renal, or hepatic disease. Serum penicillin concentrations were determined by the *Sarcina lutea* disc-plate method and serial two-fold tube dilution technique. Zone diameters with the plate method were somewhat smaller with penicillin V than with penicillin G and were usually not obtained at concentrations of 0.03 unit per milliliter.

Mean serum concentrations at $\frac{1}{2}$, 2, 4, and 8 hours, following doses of 400,000 units of penicillin G were 1.0, 0.88, 0.38, and 0.16 unit per milliliter, respectively, and following penicillin V, same doses, were 0.57, 1.46, 0.49, and 0.08 unit per milliliter, respectively. Eight hours after administration, 12 of 15 patients receiving penicillin G had levels of 0.03 unit per milliliter, or greater, contrasted with 6 of 12 patients receiving penicillin V.

Mean serum penicillin concentrations at the same intervals following 1 million unit doses of penicillin G were 1.31, 1.19, 0.32, and 0.14 units per milliliter, and those following penicillin V, same doses, were 1.83, 2.44, 1.3, and 0.27 units per milliliter. Twelve of fourteen patients receiving penicillin G had levels of 0.03, or greater, 8 hours after administration as compared with 5 of 7 patients receiving penicillin V.

Penicillin concentrations of the serum samples were relatively stable in the case of both

penicillin G and penicillin V at -20°C ., but in the serum penicillin V showed considerably more rapid deterioration than penicillin G at 10°C .

Additional pharmacologic data is being accumulated.

—HERBERT LINDEN, SYDNEY FINEGOLD, and WILLIAM L. HEWITT, *departments of medicine of the University of California Medical School and of the Veterans Administration Center, Los Angeles.*

Some Observations as to Solubility and Stability

Comparisons are made between penicillin V acid, potassium penicillin G, potassium penicillin V, benzathine penicillin G, and benzathine penicillin V with respect to solubility and stability of suspensions and solutions at various pH levels over definite periods of time.

In vivo tests made include comparisons of penicillin V and potassium penicillin G in mouse protection tests against virulent type 1 pneumococci, serum concentrations in chickens following oral administration of the same two penicillins, and human serum concentrations resulting from parenteral injection of the benzathine salt of phenoxymethyl penicillin (penicillin V).

—WILLIAM ELIAS and H. JOSEPH MERRION, *Wyeth Laboratories, West Chester, Pa.*

Some Properties Such as Stability

Phenoxymethyl penicillin (penicillin V) is more stable than benzylpenicillin at $\text{pH} < 6.5$. At higher pH the condition is the reverse. There is a relatively rapid inactivation of penicillin V in serum. The in vitro activity of penicillin V against strains of *Staphylococcus aureus*, beta hemolytic streptococcus, and pneumococcus in our experiments is the same as that of benzylpenicillin. Against a strain of a non-pathogenic *Staphylococcus albus*, penicillin V was 80 percent more active than benzylpenicillin. The reason for this is not known.

Because of its physicochemical properties, penicillin V is suitable for oral administration.

After single oral doses of penicillin V, the concentration in serum during the first 3 hours after the administration is 2 to 3 times greater than that achieved with the same amount of benzylpenicillin. The concentration in serum then falls more rapidly than when benzylpenicillin is administered. After a single oral dose of 0.30 gm. of both penicillins the serum concentration is the same 6 hours after the administration. Lower stability at pH > 6.5 and greater inactivation, by serum, of penicillin V than of benzylpenicillin may be the explanation of this. When penicillin V is given together with probenecid the concentration in serum is twice that obtained with the same dose of penicillin V alone. Furthermore, the period of time during which an effective penicillin concentration is present in the blood is prolonged. An oral dose of 0.12 gm. of penicillin V and 0.7 gm. of probenecid once every 8 hours maintains continuously a concentration in serum that is effective for the majority of infections caused by bacteria sensitive to penicillin.

—N. A. DIDING and A. RUNE FRISK, *Stockholm, Sweden*.

Toxicological Properties of Various Forms

Acute and chronic toxicity of penicillin V was investigated in mice, rats, guinea pigs, rabbits, and dogs; and the effects following various

routes of administration were compared with those of procaine penicillin G, potassium penicillin G, and N, N'-dibenzylethylenediamine (DBED) dipenicillin G. After oral, intramuscular or intra-abdominal administration, the toxicity of penicillin V and DBED dipenicillin V compared favorably with that of the other penicillin forms similarly administered. Intravenously, penicillin V, it was found, could be administered rapidly without untoward effect and when compared to potassium penicillin G administered at the same rate, the latter was approximately 8 to 10 times more toxic. The mean gain in weight of rats fed 0.1 or 0.2 percent penicillin V or DBED dipenicillin V in the diet for 8 weeks was similar to that of the controls fed only the basal diet. Neither dogs administered intramuscularly or orally 100 mg./kg. daily, nor rabbits intramuscularly administered 20 mg./kg. for 8 weeks exhibited any unusual behavior or serious alterations in their mean body weights. Periodic hematological studies and microscopic examination of tissues following complete autopsies at the termination of the experiments revealed no significant changes as a result of the penicillin V or the DBED dipenicillin V.

—JEROME M. GLASSMAN, WILLIAM J. BECKFIELD, EDWARD M. GORE, ALPHONSE DERVINIS, RICHARD TISLOW, and JOSEPH SEIFTER, *Wyeth Institute for Medical Research, Radnor, Pa.*

Medical Review Bibliography

A Bibliography of Medical Reviews is scheduled for publication in May 1956 by the Armed Forces Medical Library. Arranged by subject, it will contain approximately 800 references to review articles in clinical and experimental medicine and allied fields. All of these have appeared during the calendar year 1955.

Copies of this bibliography will be supplied in the order requests are received by: The Director, Armed Forces Medical Library, Washington 25, D. C.



ESTELLA FORD WARNER

*"No Need for Acclaim . . .
But to Perpetuate
Influence She Generated"*

Dr. Estella Ford Warner, who retired this year after a distinguished career with the Public Health Service, takes to her adobe home in Albuquerque the warm affection, deep respect, and unqualified admiration of all who have known her. Her retirement is not the occasion to pay her tribute, because she does not need acclaim. Although she has been honored many times, honors are superfluous to her. These comments are offered primarily in the hope that they may help to some degree to conserve and perpetuate the influence she has generated.

When Dr. Warner was recruited for the Public Health Service by Dr. Warren Draper in 1932, she was known both here and abroad for her development of State and county maternal and child health services in Oregon. Although she had a flourishing practice in pediatrics in Portland, where she had earned a medical degree at the State university, she took up public health work because of her conviction that "the best road to good child health is preventive medicine on a community basis."

The first woman to enter the commissioned officer services of the United States, Dr. Warner was an important addition to the Public Health Service both as a physician and as an administrator. At all times, she has personified competence of a very high level.

Her direct contributions to public health have been described elsewhere, if all too briefly.

They are an important element in the chronicles of world health progress, and it is to be hoped that some day they will be celebrated in history as they deserve. The strategic value of her work with mothers and children, with indigenous primitive tribes on reservations in the southwest, with families of warworkers housed in trailers and other temporary quarters during the war, with Federal assistance to State health departments, and with expanding health services in Asia is yet to be seen in perspective.

The achievement in itself is impressive. The effects of programs she advanced for malaria control and sanitation in India alone are certain to extend and enrich millions upon millions of lives.

While what she has done commands respect, these achievements are noteworthy as well for the spirit and method of their accomplishment. Perhaps this is best indicated by the fact that of all those men and women who have been assigned to her staff, there are none who speak of having worked "for" Dr. Warner. It is not an affectation when they say they worked "with" her. It is a tacit and grateful acknowledgment of the fact that in every endeavor she created a pervading sense of shared purpose and action.

She took to heart the doctrine that democracy is a way of working as well as a way of living. As a division chief, she demonstrated her characteristic ability to accept and make use of new ideas and methods. Since it was not in her

nature to be authoritarian, she was always as ready to hear from her staff members as to give counsel and guidance.

Her accomplishments have been world enriching, her methods inspiring. She has attained the high goals she set for herself and, in so doing, has established new goals for those who follow.

With such concepts and attitudes, it was to be expected that her office would be the source of creative ideas in public health, that it would be eager to perform real functions rather than to pretend to formal responsibilities, that it would constantly evaluate, and reevaluate, the performance of public health services.

On the eve of her retirement, she was continuing to encourage health workers in foreign missions to write what they observed and what they were doing about public health, in line with her constant wish to focus health concepts on living processes.

If further tribute is to be paid to Dr. Warner by her colleagues, they can do no better than apply her concepts, to be sensitive to public needs, to observe and report what is being done and what can be done, and to proceed in concert to meet public needs as they are understood.

—By LEONARD A. SCHEELE, *Surgeon General, Public Health Service.*

On Rehabilitation

"In Salt Lake City recently, over a 6-month period, half the applicants for public assistance whose need was due to a father's desertion were handled by a trained social worker who stressed the services that would help cure the problem. The other half were handled routinely—their need was established and payments were made, but no special help was given in eliminating the cause of need. At the end of 6 months, assistance payments to the families who had received professional self-help services were 41 percent less than assistance payments to the other families.

"In New York City, over a period of 3 years, a skilled welfare staff focused on a direct effort to return persons to self-support. Of a total of 2,700 cases, involving persons who had been unemployed from 1 to 19 years, 616 were restored to independence as a result of services provided by social workers. The savings in the actual cost of assistance has been \$616,000 per year. But far more important than the savings of tax dollars is the promise of a richer life for human beings.

"In New York State, 3,600 disabled persons were returned to employment and a self-sustaining life through vocational rehabilitation last year. These people were earning less than \$1.5 million a year when they started on the road to self-support. The first year after rehabilitation, their earnings were estimated at more than \$8 million—almost a six-fold increase.

"In the Nation as a whole, more than 11,000 of those rehabilitated last year had been receiving public assistance payments. It cost about \$8 million to rehabilitate this group—but in just one year it would have cost almost \$10 million to maintain them on relief. Relief costs generally were stopped and earnings and tax payments were started, but the richest reward from this program is the conversion of misery and despair into hope, dignity, and a productive life."

—MARION B. FOLSOM, *Secretary of Health, Education, and Welfare.* From an address before the Rochester City Club, Rochester, N. Y., March 3, 1956.

In planning community X-ray programs, it is useful to know why some people appear for screening and others stay away. A psychological study suggests three apparently significant factors in the public attitude toward chest X-rays.

Why People Seek Diagnostic X-Rays

By GODFREY M. HOCHBAUM, Ph.D.

MANY well-organized, efficiently handled, and very successful community X-ray programs have been conducted throughout the United States. Yet, even in the most effective ones, various segments of the population have failed to obtain X-rays. There is evidence that these segments include groups in which tuberculosis is highly prevalent.

It is hoped that better knowledge of factors which determine whether or not people obtain chest X-rays will help in planning more effective programs, especially for those unresponsive population groups. With this in mind, the National Tuberculosis Association and the Public Health Service jointly sponsored a study to identify some of these factors.

For this study, intensive personal interviews were held with 450 persons in Boston, 450 in

Cleveland, and 300 in Detroit, all 25 years of age or older. The respondents were selected in each city on the basis of random population sampling. The interviews, each lasting more than 1 hour, were designed to stimulate the respondents to express their opinions as well as their feelings and attitudes concerning psychological, sociologic, and administrative aspects of case finding for tuberculosis. To learn more about opinions, attitudes, and feelings than is usually expressed when only direct survey questions are asked, use was made of various psychological techniques, such as projective questions.

Of the 1,200 persons interviewed in the 3 cities, only 42 percent had voluntarily and without having any signs or symptoms of illness obtained one or more chest X-rays to check for tuberculosis. Another 16 percent stated that they had obtained X-rays voluntarily, but that they had done so because they had noticed symptoms which they thought might be due to tuberculosis. Fourteen percent said they had had all their X-rays either because other persons or groups had pressed them or because the X-rays had been required for one reason or another. A few persons had had X-rays to check for heart trouble or lung cancer rather than for tuberculosis. For about 10 percent who had had X-rays, no consistent and typical pattern could be established. Seventeen percent of the 1,200 persons had never in their lives had an X-ray.

Whether or not a person voluntarily obtains

Dr. Hochbaum is a research psychologist, Behavioral Studies Section, Division of General Health Services, Public Health Service. This article is a modification of a paper he presented at the annual meeting of the National Tuberculosis Association, Milwaukee, Wis., May 25, 1955. It deals with only one set of findings from a study on voluntary participation of the public in tuberculosis case-finding programs. A discussion of all the findings, as well as a fuller description of sampling procedure, study design, and techniques of obtaining data, will be published in monograph form at a later date.

a chest X-ray when given the opportunity is the result of a decision made by him. The fundamental problem with which this research was concerned, therefore, can be expressed by the following questions: Why and under what conditions do people decide to seek chest X-rays when given the opportunity? Why and under what conditions do they decide not to? Since a decision to act still may not result in an act, a further question must be posed: What conditions make it more likely or less likely for people who have decided to obtain X-rays actually to obtain them?

Obviously, many factors must be examined to answer these questions. Some of these are psychological in nature; others, sociologic; and still others, situational. No single factor ever determines by itself whether a person will or will not voluntarily obtain a chest X-ray. Hence, the study was designed to deal with a variety of factors. It was designed, further, not only to identify the factors that influence people to seek diagnostic X-rays, but also to determine how various factors affect each other.

This report is concerned with only one set of factors investigated by the study. These factors, even when considered by themselves, appear to be of particular significance to the question of why people seek diagnostic X-rays. A report to be published at a later date will discuss these factors in relation to several others investigated in the study.

The Three Factors

The first in this set of factors is a person's conviction that he himself could really contract tuberculosis.

The second is a person's conviction that he might have tuberculosis for a considerable period of time without being aware of it—that is, without experiencing any outward symptoms of illness—and that only through a chest X-ray could the fact that he has the disease be ascertained.

Among 798 persons in the sample who had unrestricted freedom and opportunity to obtain X-rays (that is, excluding persons who had had X-rays because they were required to do so and also those who obtained X-rays for reasons not relevant to this analysis), 442 believed that

they could contract tuberculosis and also that X-rays alone would show the presence of the disease at an early stage. Over 80 percent of this group, although feeling healthy and free from any symptoms at the time, had voluntarily obtained X-rays. In contrast, 356 persons either did not believe that they would ever contract tuberculosis or were certain that they would be aware of it if they had the disease. Half of this group either had never had X-rays or had obtained them only after they had noticed what to them seemed suspicious symptoms.

From the nonmedical point of view, this behavior is quite rational. If a person is convinced—rightly or wrongly—that he will never have tuberculosis, it would seem to him a complete waste of time and effort to check on whether he does have it. And if a person is convinced that there will be some sign of illness, some pain or disfunction, as soon as he has become infected, he is also convinced that he could not have tuberculosis as long as he feels completely well. Such a person, too, would regard X-rays as completely unnecessary and would obtain them only when he notices signs which he thinks might be symptoms of tuberculosis.

Briefly, then, the findings indicate that people are likely voluntarily to seek diagnostic X-rays only if they really believe that they might contract tuberculosis and that it would be dangerous to rely on the appearance of outward symptoms.

The third factor is a person's belief that early detection of tuberculosis would decrease the problems and worries which he thinks would arise for him should he ever contract the disease. About 90 percent of 510 persons holding this belief had voluntarily obtained X-rays, a percentage about twice the percentage found among those who did not hold this belief.

Again, this is not at all irrational from the layman's point of view. To the medical profession, early detection means better prognosis or shorter, simpler therapy. But many people were found to worry less about prognosis or difficulty of treatment than about such things as losing their jobs and income, the shattering of their careers, or the financial burden on their families. Many of these people did not feel

that early detection of tuberculosis would do much to alleviate these problems. For them, detection of tuberculosis—early or late—may, with good reason, appear threatening rather than beneficial. They therefore tend to avoid being X-rayed.

In other words, people tend to obtain X-rays only if they feel that by early detection of tuberculosis those problems which they worry about can be avoided or at least considerably decreased.

Of particular interest in a study of why people obtain X-rays are those population groups among whom a relatively high tuberculosis prevalence has been reported but who often show very poor participation in screening programs. In this study, data for two of these groups, older males and people with low incomes, were analyzed.

It was found that the three factors described cut across socioeconomic classes and sex and age categories. That is, people who believe they might get tuberculosis, those who do not rely solely on symptoms as a stimulus for seeking X-rays, and those who see benefits for themselves in early detection of tuberculosis are likely to obtain X-rays voluntarily regardless of their economic status, their sex, or age. One thing that characterized the nonparticipating groups was that fewer persons in these groups held those beliefs.

Knowledge and Action

In looking over these three factors, one may be tempted to conclude that many people still are not informed about tuberculosis and about the role of X-rays. But such a conclusion is not justified. What we are dealing with here is not merely a matter of information. It is a matter of real belief and of a conviction on the part of people that such information applies to them personally and that it is important to them as individuals.

Without question, a person must know what to do, when to do it, and how to do it before he can take action. But merely knowing these things will usually be insufficient to elicit the action to which they relate. Each of us keeps a storehouse of knowledge about things to do for our own health and welfare. But there is

a gap between having this knowledge and applying it in our own behavior. We learn to give the correct answers to questions long before we apply the information in voluntary action.

In view of these facts, it is not surprising that, although most people in the sample were able to give correct answers to direct informational questions, many of them still had never voluntarily applied this information by obtaining X-rays.

The following will illustrate this. During the interview, respondents were asked a direct informational question to see whether they knew that chest X-rays can detect the presence of tuberculosis before the patient becomes aware of outward symptoms of the disease.

Over 80 percent of the respondents were able to give correct answers to this question although many of them had never voluntarily obtained X-rays. Later in the interview, this subject was taken up again through a number of indirect, or projective, questions. These were designed to reveal beliefs and convictions, rather than merely factual information.

Analysis of the answers given to these projective questions yielded an interesting finding: Many of the respondents who had proved themselves fully informed concerning the fact that one can have tuberculosis without knowing it betrayed in their responses that they, to at least some degree, felt that they themselves would know if they had tuberculosis. Only about 35 percent of 543 such respondents had ever voluntarily obtained a chest X-ray without first noticing signs or symptoms of illness. Among those in whom this belief was especially strong, this percentage drops to about 20.

On the other hand, X-rays had been obtained voluntarily by 80 percent of the persons whose responses to the projective questions indicated that they believed fully that they themselves could have tuberculosis for a considerable period of time without knowing it.

Conclusion

It should be emphasized again that this report deals with only three of the many factors that determine whether a person decides to obtain a chest X-ray and whether he follows up

his decision with appropriate action. Additional factors are being investigated in this study, and the results should further increase our understanding of the nature of voluntary health behavior.

To be of real value, however, the findings of

this study must be tested in actual practice under controlled conditions. Such coordination between research and program application is a must if research is to pay maximum dividends in ever-increasing sound health practices by the public.



Pathological and Laboratory Services To Hospital Patients in Iowa

Of interest to hospital associations and administrators, as well as to physicians, pathologists, and laboratory technicians, is a recent decision by a district court of the State of Iowa, involving the provision of technological services to hospital patients. The case was that of *Iowa Hospital Assn., et al. v. Iowa State Board of Medical Examiners, et al.*, District Court, Polk County, decided November 28, 1955.

A group of some 30 nonprofit hospitals had brought an action for declaratory relief following the issuing of an opinion by the State attorney general. The major issue, as defined by the court, was whether "in purveying to patients . . . medical services in the form of laboratory procedures and X-ray procedures for compensation" the hospitals were engaged in "the illegal corporate practice of medicine."

The court ruled that they were so engaged and concluded, in addition, that under the practices described the pathologists or radiologists permitting a hospital to bill for medical services in the name of the hospital, without obtaining patient consent, violated the Iowa statute prohibiting fee splitting.

The Iowa State Hospital Association and the Iowa Medical Society were arrayed against each other in this litigation. The first joined with the hospitals as a plaintiff in the action, and the medical society intervened in behalf of the defendants which, in addition to the State

attorney general, included the Iowa State Board of Medical Examiners and the Iowa Association of Pathologists.

The arrangements for supplying pathological and laboratory services which had been practiced by the plaintiff hospitals and which the court condemned as violating the Iowa statutes are set out in detail in the court's findings. They were of long standing in the State and do not differ essentially from procedures commonly followed elsewhere. The opinion recognized that the facilities of pathology and X-ray laboratories are essential parts of a modern hospital that the plaintiff hospitals could continue to maintain. Further, it expressed the belief that the supplying of such services could be worked out "on the local level and within the law." The extent and nature of the required adjustment, however, were not spelled out in the opinion although changes by the hospitals in contractual arrangement with those providing services and with the patients would seem indicated.

The case has been appealed to the Supreme Court of Iowa. While the statutes involved are those of a particular State, the litigation is of unusual interest since this appears to be the first reported case in which nonprofit hospitals by such arrangements have been held in violation of medical practice acts.

A review of the experience of the metropolis during the pre-war, war, and postwar periods points to the need for continuing control programs.

Venereal Disease Control in New York City

By THEODORE ROSENTHAL, M.D., and JULES E. VANDOW, M.D.

THE recent downward trends in the incidence and prevalence of venereal disease in New York City have been observed also in other parts of the United States (1-3). Confirmatory evidence from the autopsy table is provided by Bell (4), who found marked declines in mortality due to syphilis in the past two decades. Improved methods of diagnosis, treatment, public health education, and administrative control have undoubtedly contributed to this reduction of the venereal disease problem.

Previous reports (5-9) have described in detail the character of the New York City venereal disease control program and have presented statistical data on its progress. The present report completes this information through 1954, thus providing a continuing record from 1938.

Early Control Activities

The historical background of the present venereal disease control program in New York City may be of interest. The first action in dealing with the venereal diseases as a public health problem in the city was initiated by

Biggs in 1912 (10). His program embraced the following pioneer steps:

1. Making syphilis and gonorrhea reportable diseases.

2. Offering diagnostic laboratory tests (including serologic tests for syphilis) for venereal disease to all physicians in the city without charge.

3. Advocating establishment by the health department of special clinics for diagnosis and treatment of venereal disease. (These clinics were for diagnosis and advice only. Five years later, in 1917, treatment was included in the services of the health department clinics also.)

4. Providing special hospital facilities for venereal disease cases.

5. Carrying on an educational campaign against patent nostrums and quackery in the field of venereal diseases. An attempt was made to follow Biggs' recommendations; inadequate staff prevented the full development of this forward-looking program for a score of years.

In 1935, a survey by the American Social Hygiene Association revealed the startling information that there were over 1 million men, women, and children in New York City suffering with syphilis or gonorrhea (378,000 with syphilis and 750,000 with gonorrhea), one-fifth of whom were infectious. The survey also revealed that 700 residents of New York City were being admitted annually to State hospitals for general paresis and other syphilis of the central nervous system.

Dr. Rosenthal is assistant commissioner of the City of New York Department of Health, New York, N. Y. Dr. Vandow is chief of the division of social hygiene, bureau of preventable diseases, and is also a special consultant to the Public Health Service.

During the period 1912-35, venereal disease control in the New York City Department of Health was a responsibility of the bureau of preventable diseases. In 1935, based on the

survey and recommendations of the American Social Hygiene Association, a separate bureau of social hygiene was created to administer the venereal disease control program. Under a full-

Table 1. Cases of syphilis reported in New York City, calendar years 1938-54

Year	Estimated population in thousands	Number of cases									
		Total		Primary or secondary		Early latent ¹		Congenital		Other ²	
		Number	Rate ³	Number	Rate ³	Number	Rate ³	Number	Rate ³	Number	Rate ³
1938	7,363	37,077	503.6	5,051	68.6	1,400	19.0	1,654	22.5	28,972	393.5
1939	7,416	32,874	443.3	3,411	46.0	2,054	27.7	1,467	19.8	25,942	349.8
1940	7,466	30,718	411.4	3,113	41.7	3,798	50.9	1,135	15.2	22,672	303.7
1941	7,510	27,194	362.1	2,957	39.4	4,720	62.8	966	12.9	18,551	247.0
1942	7,553	30,036	397.7	3,406	45.1	5,288	70.0	940	12.4	20,402	270.1
1943	7,597	25,878	340.6	4,252	56.0	5,551	73.1	651	8.6	15,424	203.0
1944	7,641	23,069	301.9	4,841	63.4	5,612	73.4	572	7.5	12,044	157.6
1945	7,684	22,690	295.3	5,164	67.2	6,162	80.2	583	7.6	10,781	140.3
1946	7,728	26,765	346.3	6,063	78.5	7,338	95.0	558	7.2	12,806	165.7
1947	7,772	26,303	338.4	5,009	64.4	6,610	85.0	566	7.3	14,118	181.7
1948	7,815	25,366	324.6	3,846	49.2	6,045	77.4	645	8.3	14,830	189.8
1949	7,859	20,489	260.7	2,218	28.2	4,479	57.0	533	6.8	13,259	168.7
1950	7,903	21,795	275.8	1,304	16.5	4,081	51.6	488	6.2	15,922	201.5
1951	8,042	22,458	279.2	801	10.0	3,461	43.0	545	6.8	17,651	219.5
1952	8,086	25,078	310.1	784	9.7	3,177	39.3	530	6.6	20,587	254.6
1953	8,078	25,224	312.2	658	8.1	2,637	32.6	456	5.6	21,473	265.8
1954	8,041	19,412	241.4	617	7.7	2,183	27.1	390	4.9	16,222	201.7

¹ Known as "other early syphilis" in 1938 and 1939.

² Includes late latent, late, and stage unknown.

³ Per 100,000 population.

Table 2. Cases of gonorrhea, chancroid, granuloma inguinale, lymphogranuloma venereum, and nonspecific urethritis reported in New York City, calendar years 1938-54

Year	Estimated population in thousands	Gonorrhea		Chancroid		Granuloma inguinale		Lymphogranuloma venereum		Nonspecific urethritis	
		Number	Rate ¹	Number	Rate ¹	Number	Rate ¹	Number	Rate ¹	Number	Rate ¹
1938	7,363	12,935	175.7	164	2.2	-----	-----	242	3.3	-----	-----
1939	7,416	12,810	172.7	178	2.4	-----	-----	281	3.8	-----	-----
1940	7,466	14,639	196.1	288	3.9	55	0.7	258	3.5	-----	-----
1941	7,510	12,297	163.7	430	5.7	98	1.3	292	3.9	-----	-----
1942	7,553	12,032	159.3	529	7.0	97	1.3	242	3.2	-----	-----
1943	7,597	12,957	170.6	410	5.4	97	1.3	187	2.5	-----	-----
1944	7,641	14,489	189.6	310	4.1	145	1.9	202	2.6	-----	-----
1945	7,684	18,009	234.4	356	4.6	141	1.7	212	2.8	-----	-----
1946	7,728	24,350	315.1	522	6.8	161	2.1	233	3.0	-----	-----
1947	7,772	22,746	292.7	813	10.5	149	1.9	231	3.0	-----	-----
1948	7,815	23,422	299.7	562	7.2	170	2.2	224	2.9	-----	-----
1949	7,859	20,309	258.4	377	4.8	96	1.2	179	2.3	-----	-----
1950	7,903	16,784	212.4	221	2.8	78	1.0	172	2.2	-----	-----
1951	8,042	14,114	175.5	181	2.3	79	1.0	165	2.1	149	1.9
1952	8,086	12,105	149.7	194	2.4	50	.6	139	1.7	191	2.4
1953	8,078	12,505	154.8	255	3.2	45	.6	82	1.0	847	10.5
1954	8,041	12,379	153.9	159	2.0	37	.5	68	.8	1,238	15.4

¹ Per 100,000 population.

time bureau director, many of the recommendations made in the survey report were carried out. Among the most important were the following:

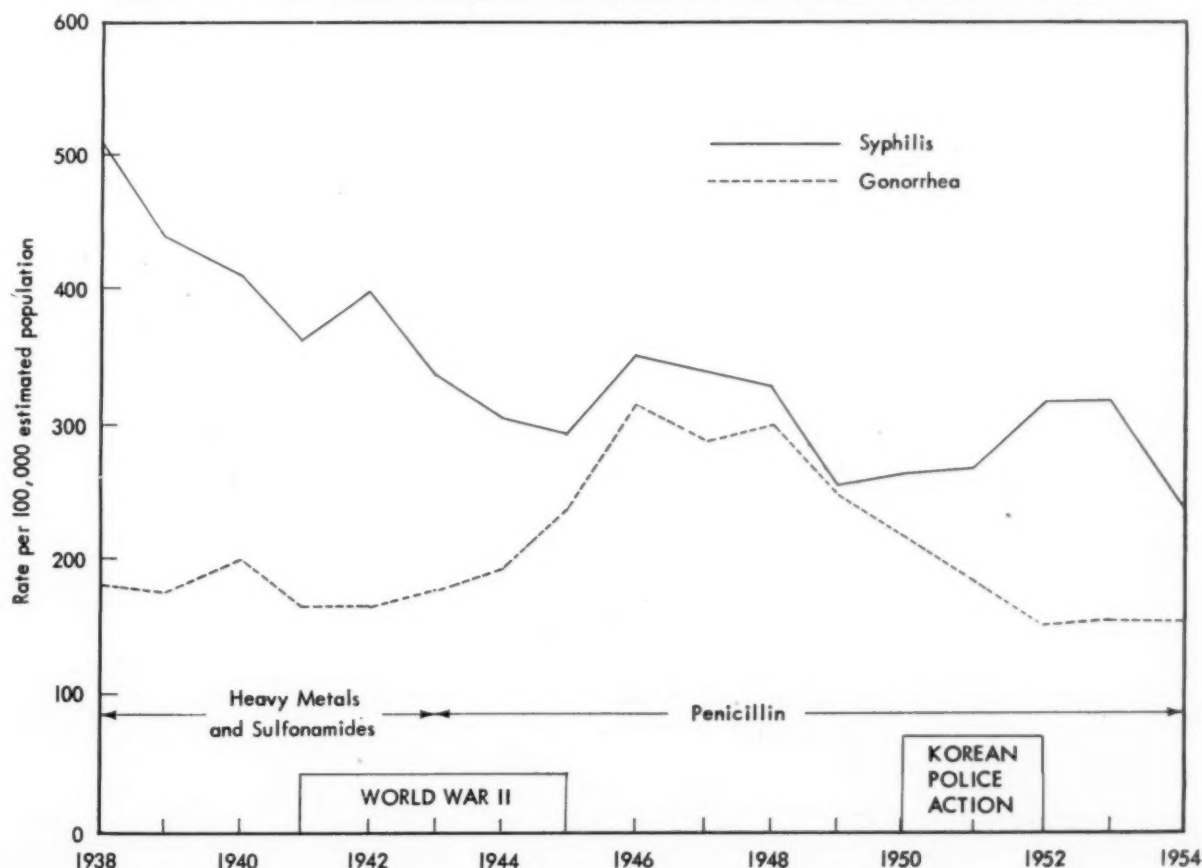
1. Increase of laboratory services to aid physicians in the diagnosis of persons infected with venereal diseases.
2. Establishment of a consultation service to advise practicing physicians in the handling of their venereal disease patients.
3. Expansion of case-finding and case-holding services.
4. Utilization of all available media to educate and inform the public as well as to provide technical instruction to physicians, nurses and others.
5. Improvement in reporting procedures.
6. Provision of free drugs to hospitals, clinics, and private physicians.
7. Cooperation with other departments of city, State, and Federal governments and with voluntary institutions and professional groups.

In addition, a comprehensive research program was carried out, including investigations on intensive treatment methods in early syphilis, evaluation of drugs in the treatment of syphilis, and fundamental studies in lymphogranuloma venereum and granuloma inguinale.

Modern Control Program

Several years were required to familiarize physicians and personnel in hospitals, clinics, and laboratories with their basic responsibilities concerning morbidity reporting. For this reason, morbidity statistics for the venereal diseases prior to 1938 are not completely reliable; as a matter of fact, syphilis cases were tabulated merely on the basis of positive serologic reactions in the laboratories of the health department. Since 1938, however, the morbidity reporting system has been on an efficient and reliable basis, eliminating to as great an extent as possible all duplications. Specially trained

Figure 1. Newly reported syphilis and gonorrhea cases, New York City, 1938-54.



physicians have been available since 1935 to consult with practitioners throughout the city on any phase of their venereal disease problems. This has tended to improve accuracy and completeness in reporting.

Local public health regulations contained in section 88 of the New York City sanitary code, supplemented by article 17B of the New York State public health law, provide for control of infected persons, morbidity reporting by physicians and institutions, and reporting of positive laboratory findings by clinical laboratories.

The Prewar Period, 1938-41

Tables 1 and 2 present in detail the number of reported cases and rates per 100,000 population for each venereal disease reported in New York City during the period 1938-54. The year 1938 marks the first year that these data may be considered to be reliable. In that year, 37,077 cases of syphilis were reported, a rate of 503.6 per 100,000. In the same year, almost 13,000 cases

of gonorrhea were reported, representing a rate of 175.7 per 100,000.

From 1938 to 1941, the number of reported cases of syphilis steadily declined to 27,194, the rate falling to 362.1 per 100,000. There had been close cooperation with the Selective Service System for distribution of social hygiene literature to prospective registrants. Educational activities had been increased throughout the city and every possible aid, such as films, lantern slides, posters, and pamphlets, had been made available to the various military installations located within the city.

Syphilis was declining in New York City at a fairly rapid rate even before the advent of penicillin. It is felt that this decline resulted from the comprehensive control measures that had been in effect since 1935. Primary and secondary syphilis declined almost 50 percent in this same period.

During this period, there was little change in the reported number of cases of gonorrhea.

Figure 2. Syphilis cases, by stage of disease, New York City, 1938-54.

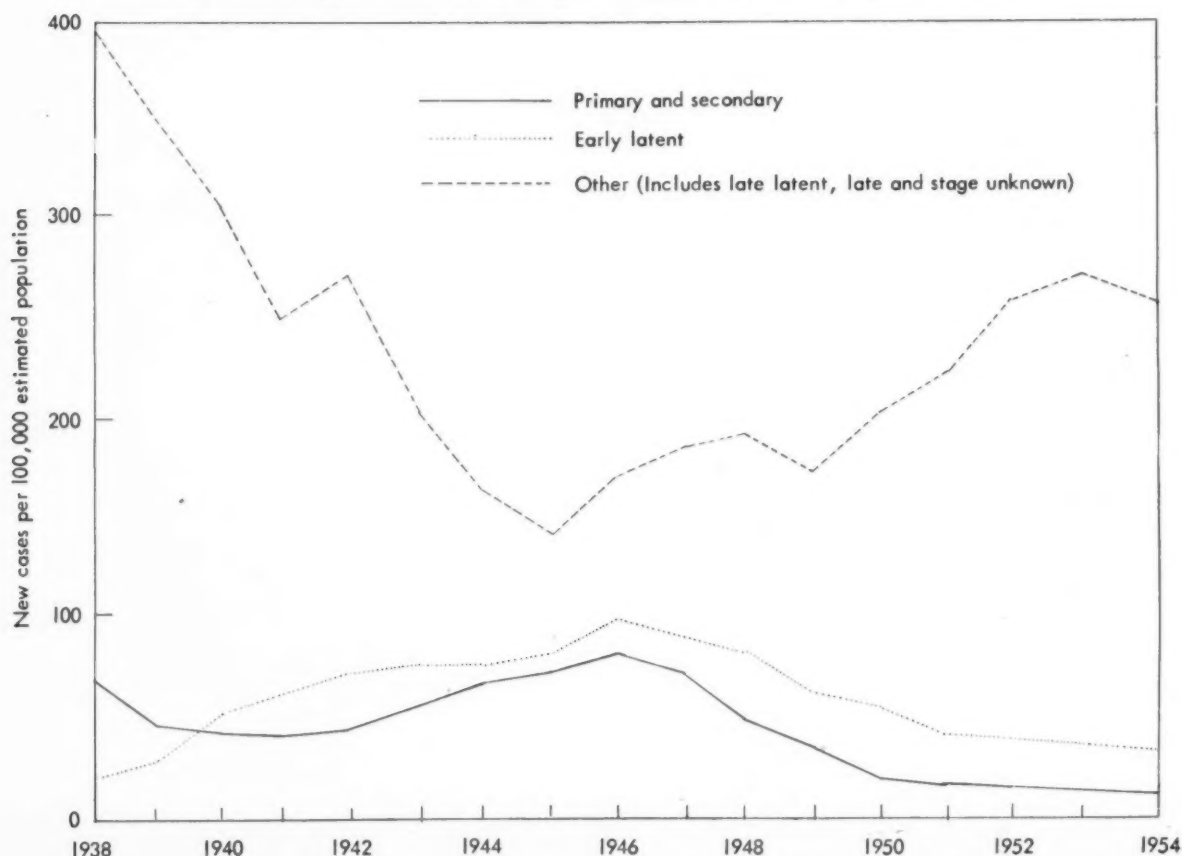
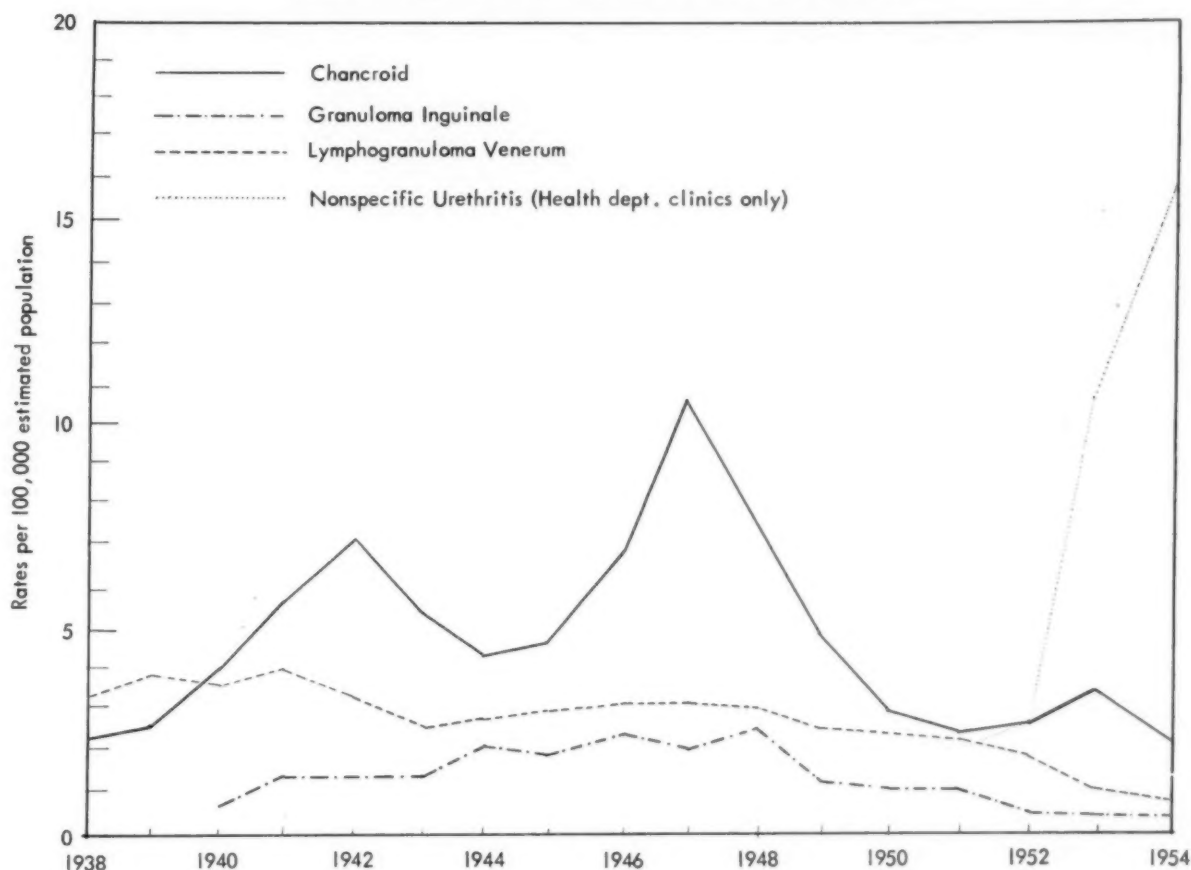


Figure 3. Newly reported cases of chancroid, granuloma inguinale, lymphogranuloma venereum, and nonspecific urethritis, New York City, 1938-54.



Apparently control measures that were effective against syphilis had little effect against gonorrhea. The same could also be said for chancroid since this disease appeared to be increasing steadily each year so that, in 1941, the rate was 5.7 per 100,000, more than two and one-half times higher than in 1938.

It may be concluded, nevertheless, that the expanded venereal disease control program that was put into effect in 1935 was an important factor in preventing a rise in the incidence of syphilis and gonorrhea during the period of military and industrial mobilization just preceding the actual outbreak of World War II.

The War Period, 1941-45

With the country engaged in a global war, the problems of venereal disease control were multiplied enormously. Because New York City is a great seaport and railroad center, it became an important point of embarkation for

millions of soldiers. Soldiers and sailors flocked to the city nightly from the many nearby military installations. Industrial workers poured into the city by the thousands, attracted by the expanded industrial activity.

Close cooperation was maintained by the city with each branch of the military service. The Armed Forces Disciplinary Control Board was created at this time to secure even closer cooperation with civilian agencies charged with control of prostitution, sale of alcoholic beverages, and related matters. Reported venereal disease contacts of members of the armed forces who had allegedly been infected in the New York area were over 10,000 each year. Every effort was made to locate and secure the medical examination of the persons named as contacts (11), and approximately 60 percent of these were located.

During the war period, primary and secondary syphilis increased over 40 percent and early

Table 3. Number and percentage of reported cases of syphilis and gonorrhea, by reporting agency, 1940-54

Year	Syphilis								Gonorrhea							
	Total	Private physician		Health department clinics		Other		Total		Private physician		Health department clinics		Other		
		Number	Percent	Number	Percent	Number	Percent			Number	Percent	Number	Percent	Number	Percent	
1940 -----	30,718	11,274	36.7	12,136	39.5	7,308	23.8	14,639	3,092	21.1	6,248	42.7	5,299	36.2		
1941 -----	27,194	10,226	37.6	9,729	35.8	7,239	26.6	12,297	2,700	22.0	4,413	35.9	5,184	42.1		
1942 -----	30,034	11,638	38.7	9,566	31.9	8,830	29.4	12,023	2,095	17.4	4,762	39.6	5,166	43.0		
1943 -----	25,878	10,068	38.9	8,293	32.1	7,517	29.0	12,957	1,533	11.9	6,004	46.3	5,420	41.8		
1944 -----	23,069	9,653	41.8	5,631	24.4	7,785	33.8	14,489	2,104	14.5	6,904	47.6	5,481	37.9		
1945 -----	22,690	9,705	42.8	5,171	22.8	7,814	34.4	18,011	2,703	15.0	9,249	51.4	6,059	33.6		
1946 -----	26,765	10,212	38.2	7,538	28.1	9,015	33.7	24,350	2,894	11.9	15,073	61.9	6,383	26.2		
1947 -----	26,303	11,355	43.2	6,940	26.4	8,008	30.4	22,746	2,321	10.2	15,924	70.0	4,501	19.8		
1948 -----	25,366	11,531	45.5	6,273	24.7	7,562	29.8	23,422	2,991	12.8	15,079	64.4	5,352	22.8		
1949 -----	20,489	8,061	39.3	5,776	28.2	6,652	32.5	20,309	2,736	13.5	13,954	68.7	3,619	17.8		
1950 -----	21,795	8,198	37.6	4,987	22.9	8,610	39.5	16,784	2,369	14.1	11,570	68.9	2,845	17.0		
1951 -----	22,458	9,384	41.8	4,244	18.9	8,830	39.3	14,114	2,763	19.6	8,778	62.2	2,573	18.2		
1952 -----	25,078	10,607	42.3	3,489	13.9	10,982	43.8	12,105	2,280	18.8	7,332	60.6	2,493	20.6		
1953 -----	25,224	9,658	38.3	4,792	19.0	10,774	42.7	12,505	2,681	21.4	7,464	59.7	2,360	18.9		
1954 -----	19,412	7,816	40.3	2,626	13.5	8,970	46.2	12,381	1,476	11.9	8,446	68.2	2,459	19.9		

latent syphilis increased over 20 percent. Tabulation of morbidity reports indicated early that syphilis was increasing, particularly in the younger age groups. Because of this, control measures were intensified (11). Gonorrhea rates also rose steeply, increasing from 163.7 in 1941 to 234.4 in 1945. The sulfonamides were being used for treatment; penicillin, though known to be effective, was in short supply and was reserved almost exclusively for the armed forces.

The Postwar Period, 1946-54

Following the close of the war, reports of communicable syphilis and gonorrhea continued to mount until peak levels for these diseases were reached in 1946. Since then, there has been a steady drop in reported cases. Some of the important reasons for this falling incidence are utilization of penicillin and other antibiotics, improvements in diagnostic procedures, and intensification of public health control activities. It was fortunate that at this time penicillin became freely available for civilian use. Its value against both syphilis and gonorrhea had already been well demonstrated by a number of studies in military and civilian institutions.

Improvements in laboratory procedures, such as the development of cardiolipin antigen and quantitative tests resulted in more accurate serologic tests for syphilis and better evalua-

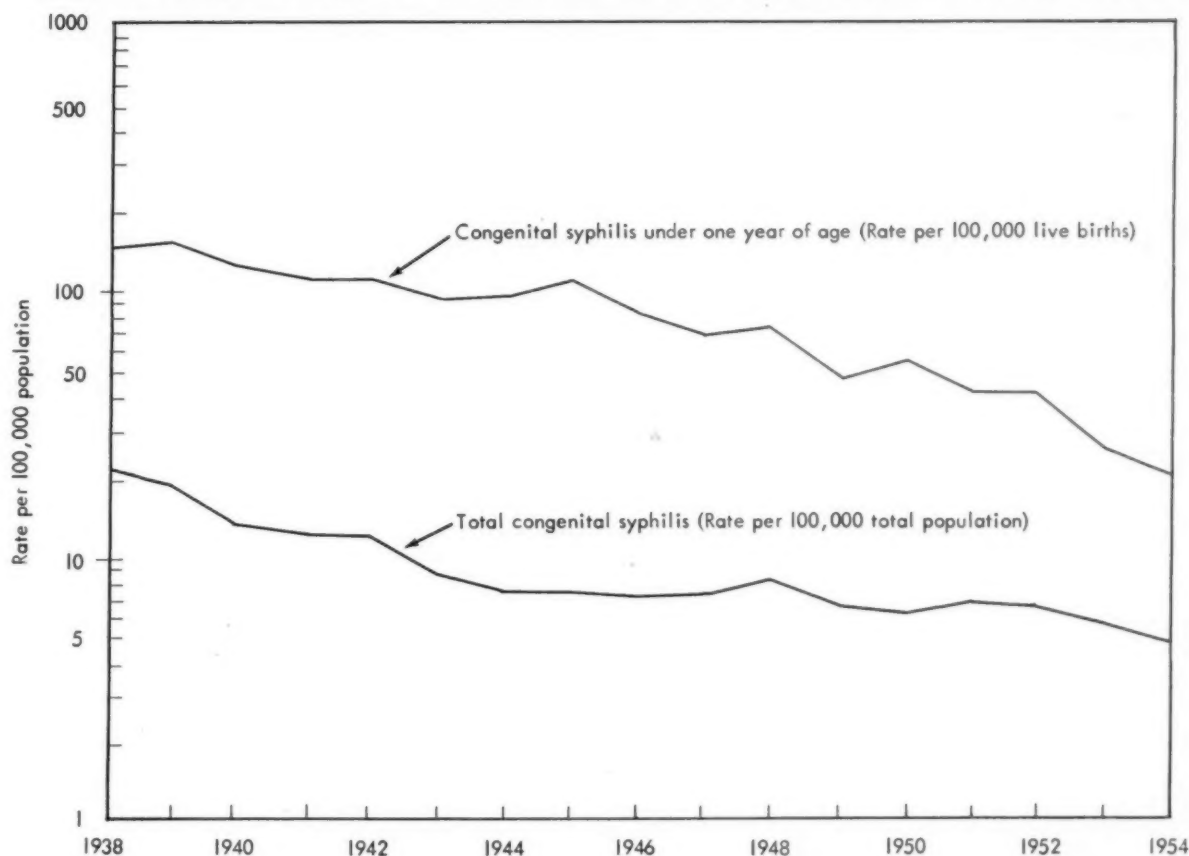
Table 4. Newly reported cases of congenital syphilis, New York City, 1938-54

Year	All ages ¹		Cases under 1 year	
	Number	Rate per 100,000 population	Number	Rate per 100,000 population
1938-----	1,654	22.5	159	162.0
1939-----	1,467	19.8	169	171.6
1940-----	1,135	15.2	141	136.2
1941-----	966	12.9	125	112.8
1942-----	940	12.4	144	112.3
1943-----	651	8.6	120	92.0
1944-----	472	7.5	116	97.5
1945-----	583	7.6	139	111.3
1946-----	558	7.2	123	82.8
1947-----	566	7.3	116	69.6
1948-----	645	8.3	115	74.8
1949-----	533	6.8	72	47.1
1950-----	488	6.2	85	55.9
1951-----	545	6.8	66	41.5
1952-----	530	6.6	67	41.8
1953-----	455	5.6	43	27.3
1954-----	390	4.9	33	20.6

¹ Includes age unknown.

NOTE: All cases of congenital syphilis are investigated for accuracy of diagnosis.

Figure 4. Congenital syphilis cases, total and under 1 year of age, New York City, 1938-54.



tion of the effectiveness of treatment. Improved culture methods were valuable in the diagnosis of gonorrhea, especially in females.

Discussion

A general picture of the reported cases of the venereal diseases in the period 1938-54 may be obtained from figures 1-3. There was little change in the rates for newly reported cases of gonorrhea until 1942, when the rate began to climb slowly. After 1944, a sharp increase occurred, reaching a peak in 1946 about twice as high as that of 1942. For 2 years, until 1948, this high level was maintained. Then, for the next 4 years, the rate steadily fell until in 1952 it was back to about the 1942 level, where it has hovered ever since.

The total number of syphilis cases fell from a rate of 503 in 1938 to 295 in 1945. The fall was steady except for a moderate increase in 1942, when many latent cases were being discovered by medical examination of draftees.

Another increase occurred in 1946 but this was mainly due to an increase in early syphilis cases after the war. Again, the total syphilis figure began to decline, reflecting a decrease in primary, secondary, and early latent syphilis. After 1949, the rate for total syphilis again rose steadily, reaching a plateau in 1952-53. This last increase was due entirely to steadily increasing reports of late latent syphilis which overshadowed the decreasing reports of infectious cases. In 1954, for the first time since 1945, late and late latent syphilis reports fell sharply, producing a decided drop in the total syphilis rates from about 312 in 1953 to 241 in 1954.

The relationships of the various stages of syphilis to each other are better seen in figure 2. From a rate of 68.6 in 1938, primary and secondary syphilis fell to a rate of 39.4 in 1941. These cases then increased each year throughout the war into the postwar year 1946, when they reached their peak, a rate of 78.5. Since

this high point, the incidence has fallen each year during the succeeding 8 years. As the chart reveals, the descending curve has almost flattened out over the past 4 years. Nevertheless, the rate of 7.7 in 1954 is less than half the 1950 rate of 16.5.

The curve for early latent syphilis almost exactly parallels that of primary and secondary syphilis from 1940 to 1954, except that the rates for early latent syphilis run at a slightly higher level than those for primary and secondary syphilis. No attention should be paid to the 1938-40 rates for early latent syphilis, since during this period early latent syphilis was referred to as early syphilis and included only latent cases of less than 1 year's duration. Undoubtedly, if cases up to 4 years' duration had been included in this diagnosis, in accordance with accepted practice since 1940, the curve from 1938 to 1940 would be higher than that indicated in the chart.

Except for the year 1942, when there was a slight increase, "other" syphilis (which includes late latent, late, and stage unknown) dropped precipitously from a rate of 393.5 in 1938 to 140.3 in 1945. Thereafter, it rose steadily to a high point of 265.8 in 1953. A "mass street survey" in 1953 uncovered many cases of late latent syphilis, which helped to push the rate up to the highest level recorded since 1942. Many of these cases undoubtedly were acquired during the war years. In 1954, more than 5,000 fewer cases of late and late latent syphilis were reported than in 1953, the rate falling to 201.7.

Table 3 indicates the number of cases of syphilis and gonorrhea reported annually from each of the three reporting sources during 1940-54. Also indicated are the percentages of the total number of syphilis and gonorrhea case reports received annually from these reporting sources.

Figure 3 shows the rates for the minor venereal diseases, and indicates the postwar peak for these diseases.

Nonspecific urethritis is not reportable in New York City. In 1951, because of the relative increase of cases, it was decided to admit and treat these patients in health department clinics. Figure 3, therefore, by no means reveals the true incidence of this disease, since the rate refers only to patients admitted by health de-

partment clinics. In 1953, nonspecific urethritis made up 11.2 percent of the total number of cases of urethritis in males seen in these clinics, which, in 1954, was 15.3 percent of such cases.

In 1938, 1,654 cases of congenital syphilis in all ages were reported; 159 were under 1 year of age. There has been a gradual decline since that time so that in 1954, 390 cases of all ages were reported, with only 33 under 1 year of age (table 4 and fig. 4).

A parallel picture is seen in syphilis of the central nervous system. A tabulation of admissions of New York City residents to State mental hospitals for syphilis of the central nervous system shows a gradual decline. In 1933, 732 cases were admitted; a progressive reduction in numbers ensued each year, with 167 being admitted in 1953 (table 5).

Another index of the decline in venereal disease prevalence is furnished by the records of the Women's Court, where all women arrested on charges of prostitution are examined for venereal disease.

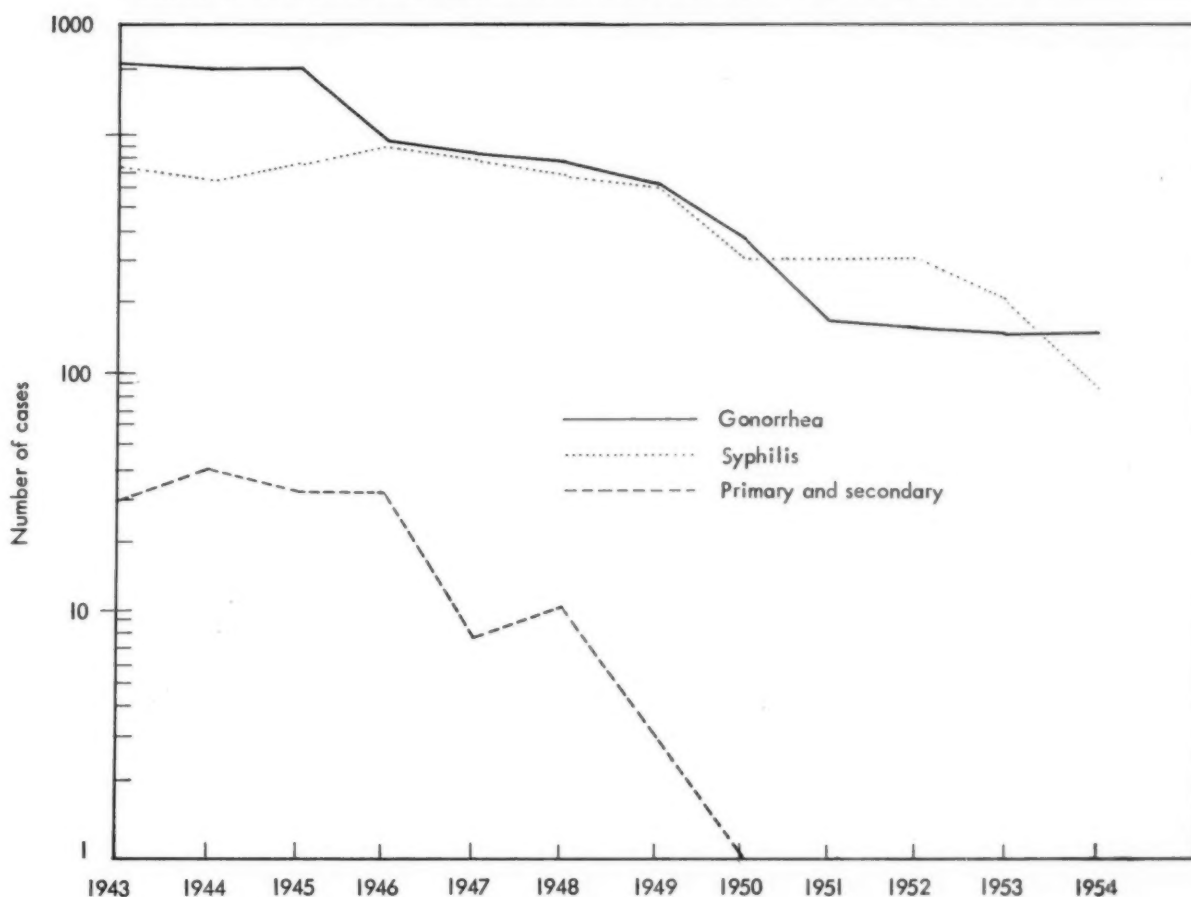
Table 5. First admissions from New York City to New York State civil hospitals diagnosed as syphilis of the central nervous system, fiscal years 1933-53

Fiscal year	General paresis and other syphilis of the central nervous system		
	Males	Females	Total
1933.....	579	153	732
1934.....	497	160	657
1935.....	551	159	710
1936.....	528	179	707
1937.....	566	183	749
1938.....	537	167	704
1939.....	561	186	747
1940.....	493	159	652
1941.....	473	186	659
1942.....	426	140	566
1943 ¹	309	104	413
1944.....	345	121	466
1945.....	333	140	463
1946.....	278	106	384
1947.....	270	107	377
1948.....	274	98	372
1949.....	215	85	300
1950.....	205	117	322
1951.....	192	79	271
1952.....	134	82	216
1953.....	98	69	167

¹ 9 months.

SOURCE: New York State Department of Mental Hygiene.

Figure 5. Number of cases of primary and secondary syphilis, all syphilis, and gonorrhea diagnosed in all women coming to the Women's Court, New York City, 1943-54.



A glance at figure 5 reveals the progressive decline in both syphilis and gonorrhea. In 1943, 34.8 percent of the women arrested were found infected with gonorrhea and 15.8 percent with syphilis. In 1954, 5.5 percent had gonorrhea, whereas only 3.4 percent were found to have syphilis (table 6).

The changing trends in case reporting, as seen in table 1, are produced by such conditions as the marked decline in lesion syphilis, the increase in latent syphilis, and the increasing use by the private practitioner of such effective remedies as penicillin and other antibiotics. In the diagnosis of syphilis, the laboratory plays a vital role. All laboratories in the city are required to report positive findings to the health department. This is an important factor in the completeness of syphilis morbidity reporting. Unfortunately, the laboratory is not uti-

Table 6. Venereal disease among women examined in Women's Court, New York, N. Y., 1943-54

Year	Number examined	Percent infected		
		Syphilis	Syphilis and gonorrhea	Gonorrhea
1943.....	4,595	10.0	5.8	29.0
1944.....	4,448	9.1	5.5	28.4
1945.....	4,814	9.4	6.5	25.7
1946.....	4,038	14.7	6.6	16.9
1947.....	3,588	14.8	5.9	18.6
1948.....	3,685	12.9	4.2	17.5
1949.....	3,269	13.1	2.8	13.6
1950.....	2,999	8.3	1.2	10.8
1951.....	2,681	9.8	.6	5.3
1952.....	2,268	11.0	.8	5.9
1953.....	2,306	7.1	.3	5.8
1954.....	2,448	2.9	.2	5.6

lized to the same extent for the diagnosis of gonorrhea, a fact which helps to explain the paucity of gonorrhea morbidity reports from private practitioners.

Conclusions

Reductions in reported cases of early syphilis, gonorrhea, and other venereal diseases have occurred in New York City since the end of World War II. Our public health control programs have skillfully combined community resources to include in our venereal disease combat teams the private practitioner of medicine; personnel of hospitals and clinics; educational institutions; social and welfare agencies; the voluntary organizations, such as the New York Tuberculosis and Health Association, Inc., and the American Social Hygiene Association; the clergy; and the Armed Forces, coordinated by the official health agencies and with, above all, an informed public.

Further reductions in venereal disease incidence will be difficult to achieve in an area such as New York City, which is not only a focal point for traffic from all parts of the United States but, in addition, is a global seaport and airport. Population movement from within the country, coupled with the increasing international traffic into the area, constitute problems beyond any local public health control.

These and other special problems peculiar to a great metropolis point to the necessity for

maintaining a vigorous program for the continued control of venereal disease.

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A Pre-Administration Curriculum in a School of Public Health

By KEITH O. TAYLOR, M.B.A.

WE ARE currently faced with the need for well-qualified administrators in the health fields. The selection of persons for such positions is difficult. The hospital field, in particular, has only in fairly recent years established graduate training for persons desirous of entering this field. The first course in hospital administration was started at the University of Chicago in 1934, but there are now 13 courses in schools with membership in the Association of University Programs in Hospital Administration.

The hospital field had the advantage of a major study of problems of hospital administration and university curriculums to meet the needs in this field. The initial major study was conducted from 1945 to 1948 by a Joint Commission on Education with Charles E. Prall as director. This study was sponsored by the American College of Hospital Administrators and the American Hospital Association and received financial support from the Kellogg Foundation. The final reports were issued in 1948 and helped to focus attention on areas which required emphasis in the academic and preceptorship periods. One subsequent study

and review has already been undertaken in this field.

Basic Recommendations

The Prall study (1), although it did not give major attention to undergraduate preparation for those desiring to enter the graduate field, did make certain rather general recommendations. It suggested that extensive specialization at the undergraduate level is probably neither necessary nor wise and that a student should aim toward a well-rounded general education. But the recommendation goes on to say that "the idea of a broad basic education should not be confused with an excessive scattering of effort." More specifically, the report says:

"Students who are completing requirements for their first degree often ask what work will be most useful if later they seek admission to the courses in hospital administration. A complete answer to this question requires knowledge of the individual's past training, special qualifications, and job experience. What is offered here must, therefore, be considered in the nature of general guidance.

"If the student is not completing a major in the social studies or psychology, one or more senior college courses in each of the following should be suggested: economics, sociology or government, psychology. If he has had only the minimum requirement in science, some ad-

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vanced work in either the biological or the physical sciences would prove to be valuable. There are circumstances, of course, where a new beginning might be preferable. The individual who has had no recent contact with chemistry or biology is a case in point. A try-out in statistics, if not restricted by prerequisites, and a course in introductory accounting should be included. The last-named is the only subject mentioned thus far as a requirement for admission."

The more recent Olsen report (2) gives added emphasis to the need for more basic preparation in the field of business but, like the Prall report, notes the importance of a well-rounded general education. To the extent to which these prerequisite ideas are correct, it is apparent that such a program might be based in any of several schools, liberal arts, sociology, business administration, to mention a few. It is, however, essential that whatever school is chosen it provide adequate flexibility.

Flexibility in Planning

At the University of California, a program of this nature has been developed in the School of Public Health. The school provides an upper division curriculum. The need for drawing on many interdepartmental disciplines to supplement the fields of major concentration makes flexibility a basic element in the school's curriculum planning.

There was little difficulty, therefore, in establishing a pre-administration program of reasonable breadth, one that could be rather readily tailored to the needs of students who had completed an associate of arts or its equivalent at the college level in their first 2 years.

Some courses at the lower division level are recommended toward advanced work which the student takes after admission to the School of Public Health, but in practically all cases any student entering at the junior year can complete the remaining lower division prerequisites and the upper division requirements within 2 years. Prerequisites include at least 9 units from the social sciences; 12 from the humanities, English, and speech; and a basic biological science, beginning accounting, and a

survey course of the health fields. When possible, a basic law course is recommended at the lower division level. Emphasis at the undergraduate level for the relatively few students who indicate an interest as early as their freshman year is toward a broad educational background and one which will allow them a maximum diversity of selection by the time they are ready finally to choose their upper division school since by that time some students will have found interest in other directions.

Admission Requirements

Selection for admission at the upper division level in hospital pre-administration is rather stringent. All students who apply are interviewed at considerable length by a full-time faculty member of the graduate course in hospital administration and are then referred to the university counseling service for testing and counseling interviews.

Students are normally referred to a local hospital administrator for further interview and assigned brief readings in the field. There are a number of reasons for lengthy consideration at this point. Many students, whether correctly or incorrectly, wish their degree in a major in which the undergraduate degree in itself will provide an entree to specific job situations. The pre-administration major and the bachelor of science degree provide an essentially broad background and not a degree acceptable to hospitals for positions in the field of hospital administration. This is also largely true of alternate selections in the upper division in the areas of public health and medical care pre-administration.

Students who wish to enter the field of hospital administration, therefore, must be prepared to maintain an adequate grade average for acceptance by a graduate school and, in the case of the University of California, must plan on a 3-year program beyond the baccalaureate in order to complete the requirements. Students, moreover, must be provided with the facts that placement in this field, while good, means willingness to go wherever positions are available and that progression in the field requires a continuing growth of the individual over a fairly long period. The rapid changes

in hospitals and related health groups in the last 20 years, the continuing technical, economic, and human relations changes now in process call for administration with breadth and flexibility.

This means that emphasis must be placed on the fact that a considerable measure of the individual's success will depend on his own ability to prove ultimately his leadership qualities. Education can provide stimulus for the individual, provoke curiosity, and give a student the base on which to build, but education cannot provide a garment of facts and techniques in which the graduate goes forth cloaked as a leader. Although the standards established for admission do not lead to a large undergraduate body, there has been a fairly steady growth of applicants.

Because of its flexibility, the course may be used, as far as the senior year, in an alternate position with other courses not only in public health but also in premedical and other fields.

Course Requirements

The usual course for the person who has selected pre-administration in his junior year includes some 44 units of selected work in the following areas: advanced psychology (usually human relations), cultural anthropology, principles of organization and management, personnel administration, managerial accounting, industrial relations, advanced economics, biostatistics, community health education, sanitation, introduction to health administration, medical sociology and medical background, and disease control. As this leaves the student a minimum of 14 additional units, other work may be selected to fit the needs or special interest of the student. Only three units of work are devoted specifically to the hospital. These are in the form of a survey course which is also taken by students from several other areas. The various types of institutions—voluntary and governmental, general, chronic, and mental—are presented in terms of their relationships to the community and to one another, as well as in the individual setting. A major objective of the survey course has been to portray the complex nature of the hospital as an institution, the kinds of problems which it faces, and the

many interrelationships with which it is concerned.

Preceptorships

Graduate students who have shown ability in their academic work and appear otherwise personally qualified are referred to the hospital administrators who have agreed to establish special preceptorships. In a very few cases carefully selected students from other schools, who have a reasonably equivalent pre-administration background, are also referred. Some students who have graduated in other fields take an extra year of graduate work prior to the internship to make up for deficiencies. This graduate year somewhat parallels the upper division pre-administration work, and these students have then entered the preceptorship on the same basis as the regular pre-administration graduate.

The preceptorship, or administrative internship, is not dissimilar to the well-established administrative residency required in all graduate courses in hospital administration. The main difference lies in the longer period of orientation to the hospital, its departments, and related activities, the somewhat more restricted degree of responsibility placed on the student in administrative situations, and the higher demands on the administrator in terms of teaching interest.

This year of education within the hospital is clearly reflected in seminar discussion and special study during the graduate academic year. Students with this background compare favorably with others whose experience in the field may have been much longer. They not only contribute to classes, but, on the basis of actual experience, are able to derive far more from case and discussion sessions at graduate level than is possible with students lacking an experiential background. Moreover, students with a minimum 2-year background following a bachelor's degree are able to enter the administrative residency with a fairly high level of preparation.

Results

The pre-administration program has been in existence only 7 years, and students have gradu-

ated from this program only in the last 5 years. Of 27 students taking their bachelor's degree in this area, 18 have continued with the advanced program, one of whom completed his graduate study at an eastern university. Fifteen students have now completed both the undergraduate program and the preparation requirement. Of that number, 8 have also completed residencies and taken appointments in the field. The rest of the 15 are either entering into residencies or the graduate academic program during the current year. Four more of the 27 graduates are now in administrative internships.

At the undergraduate level some 10 students are currently following the pre-administrative program on the Berkeley campus. Several are enrolled in a similar pre-administration program at the University of California at Los Angeles. In the past few years, a number of students who completed basically similar undergraduate programs in other schools have been placed in internships.

None of us associated with the graduate course feel that the undergraduate program outlined here is the only pattern for development of future students in administration for health fields. We do believe that the combination of social sciences, biological sciences, the humanities, and business administration, together with some background knowledge of

the health fields, is essential for a progression such as we have outlined. Such a preparatory program, however, is possible within the structure of many schools and without undue concentration by the student. Administration provides an alternate field for capable students in premedical, business administration, and several other areas. Although the field of hospital administration, itself, provides only a limited number of positions, there are at present some 200 students a year entering graduate work in this field alone, and graduates are also taking positions in allied health fields.

Careful selection and guidance of college students with real aptitude and ability can, we believe, help to attract outstanding students to the fields of health administration. Our experience with the progress of students, even though the program is still relatively new, has been encouraging to us and has proved acceptable to students, preceptors, and faculty alike.

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Project to Combat Tuberculosis in Indians

A 3-year program to reduce tuberculosis among southwestern Indians will be conducted by the Phipps Institute of the University of Pennsylvania under contract with the Public Health Service.

The tuberculosis incidence is about nine times higher among Indians than among the non-Indian population of the United States. The institute will conduct field studies and administer drugs to assist in the prevention and treatment of the disease in about 8,700 children.

Affected by the plan will be the United Pueblos and the Jicarilla and Mescalero Apaches of New Mexico and the Consolidated Utes of Colorado. If techniques prove successful, they will be extended to other areas.

Poliomyelitis Survey in Rio de Janeiro

By MAURICIO MARTINS da SILVA, M.D., and JEROME T. SYVERTON, M.D.

CLINICALLY recognizable poliomyelitis was accepted in Brazil as an endemic disease of sporadic occurrence until 1953. Rio de Janeiro with a population of 2,626,875 had 25 reported cases per year from 1949 to 1952, an attack rate of 0.9 per 100,000 and a case-fatality rate of 20 percent (1). The disease occurred evenly throughout the year with perhaps a slight increase in incidence during the summer months of November, December, and January.

In 1953, the impact of a severe epidemic alerted physicians and health authorities. A total of 746 cases were reported from Rio de Janeiro. Of these patients, 561 were classified as residents and 185 as nonresidents. The nonresidents were patients from neighboring states who came to Rio de Janeiro for medical treatment. The result for this single year was a

resident attack rate of 21.5 per 100,000 and a case-fatality rate of 4.6 percent.

In 1954, the disease again assumed epidemic proportions with a recorded total of 356 patients (245 residents and 111 nonresidents). The resident attack rate was 9.3 per 100,000 and the case-fatality rate, 4.2 percent. The epidemic curves for the 2 years are shown in the figure. The analysis of the 1954 data showed that 91.8 percent of the cases occurred in children under 5 years old (83.6 percent under 3 years) and no cases were seen in persons over 40 years of age. It further showed that a larger percentage of cases (60 to 70 percent) came from higher than average socioeconomic groups as determined by the type of residency, sanitary installations, and race (67.7 percent white, 32.3 percent non-white).

Prior to 1953, the only other recent epidemic of poliomyelitis in Rio de Janeiro was in 1939. Then 287 cases were recorded.

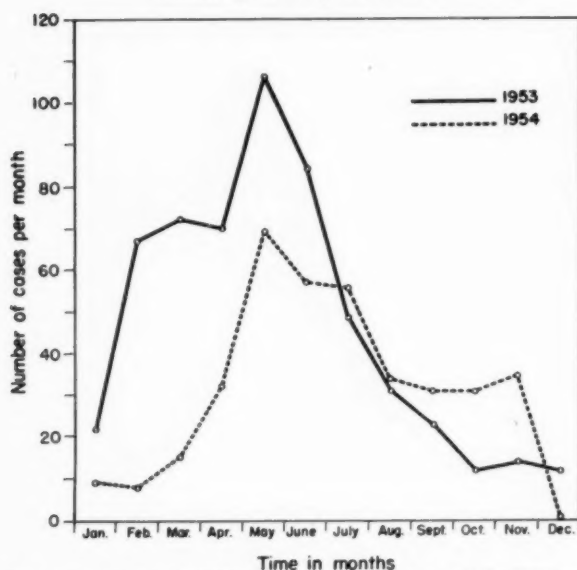
In other tropical and subtropical countries and in areas of the world where standards of hygiene are generally poor, exposure to the poliomyelitis viruses and the consequent development of antibodies occur almost universally and at an earlier age than in communities in which hygienic standards are higher (2-9). Crowded conditions and frequent pollution of the environment facilitate the spread of any disease in which the etiological agent is present in the oropharynx and stools (8).

Serologic evidence of the extent of poliomyelitis infection in the general population of Brazil is limited to a single study reported in 1937 by Hudson and Lennette (10). These workers examined serum samples from 10

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Dr. Waldir Cordeiro de Moraes and Dr. Helio Lopes da Costa, members of the staff of the third pediatric service, Sao Zacharias Hospital, obtained the samples, and Companhia Harkson Industria Comercio Kibon and Pan American World Airways provided air transportation of these samples.

Poliomyelitis incidence by month in Rio de Janeiro, Brazil, 1953-54



Courtesy of Dr. Aristides Paes de Almeida, epidemiology service, Department of Hygiene, Rio de Janeiro, D. F., Brazil.

Brazilians ranging in age from 10 to 30 years. They resided in the town of Formosa in the State of Bahia, Brazil. The method for assay of neutralizing poliomyelitis antibodies was qualitative by present-day standards; the MV strain of virus (11) used in the study presumably was poliomyelitis virus, type 2 (Lansing). This study revealed that 8 out of the 10 persons had neutralizing antibodies for MV virus. In 1937, epidemics of poliomyelitis were not known in Bahia, and only a few deaths were reported from scattered parts of Brazil.

This study was undertaken to learn from serologic evidence the extent of previous poliomyelitis infections in Rio de Janeiro and thereby provide information helpful to an understanding of the recent epidemic outbreaks in Brazil and of the global epidemiology of poliomyelitis.

Materials and Methods

Blood samples from 111 persons of 3 representative socioeconomic groups in Rio de Janeiro and its environs were collected in July and August 1954. An attempt was made to obtain donors, aged 6 or 7 years, for a comparative study of antibody patterns in a similar age group in the United States. In group A

two-thirds of the children resided in slum areas located on the hills of the city and one-third were from a semirural grade school of the Federal District. Overcrowding, lack of minimal sanitary facilities (no sewage disposal or running water) characterized the environment of group A. Group B children were city dwellers living in small houses or apartments where sanitary and hygienic standards, as determined by running water, sewage disposal, adequate income, and no overcrowding, were greatly superior to those of the previous group. Group C included children from the upper income brackets, both Brazilian and foreign residents. Their standards of hygiene were as high as those of the Americans in groups D and E (12), consisting of children of University of Minnesota faculty members and University of Minnesota medical students, respectively (authors' unpublished experiments).

The sample of blood (about 10 ml.) was withdrawn aseptically without anticoagulant. Serum was separated from the clot within 24 hours and kept sealed in glass vials at refrigerating temperatures (2° to 10° C.). Quantitative assay for neutralizing antibodies in the serums was effected through use of HeLa cell cultures by the procedures employed routinely in this laboratory (14). This strain of HeLa cells has been maintained in continuous culture on glass in the laboratory since May 31, 1951.

Table 1. Distribution by immunotype and titer of poliomyelitis antibodies among three different socioeconomic groups in Brazil

Serum titer	Type 1			Type 2			Type 3		
	A	B	C	A	B	C	A	B	C
4,096 or more	1	1	0	3	5	1	0	2	3
1,024	3	10	3	5	12	3	4	8	1
256	7	14	6	9	8	6	6	8	1
64	11	9	4	8	9	4	9	13	1
16	5	9	2	3	9	1	4	8	2
4	1	2	1	0	2	3	1	2	2
0	1	13	8	1	13	6	5	17	14

A=Low socioeconomic group, urban and semirural (29 individuals).

B=Average socioeconomic group, urban (58 individuals).

C=High socioeconomic group, urban (24 individuals).

Table 2. Percentage distribution of poliomyelitis antibody by immunotype among different socioeconomic groups in Brazil and in the United States

Group	Number	Average age	Percentage with antibody to:			
			No type	Single type	2 types	3 types
A-----	29	8.6	0	3.4	17.2	79.4
B-----	58	11.8	3.4	20.6	22.4	53.4
C-----	24	18.3	4.2	29.1	37.5	29.1
D-----	26	6.5	30.7	23.1	30.7	15.4
E-----	43	20-30	20.9	41.8	20.9	16.2

A=Low socioeconomic group, urban and semirural.
 B=Average socioeconomic group, urban.
 C=High socioeconomic group, urban.
 D=Children of University of Minnesota faculty members (5-10 years).
 E=University of Minnesota medical students.

Serums were inactivated for 30 minutes at 56° C. and diluted in BSS (Hanks' balanced salt solution) medium with antibiotics and a fungicide to give fourfold dilutions ranging from 1:4 to 1:4096 (6 tubes/serum/type). One hundred TCID₅₀ (tissue culture infectious dose) of poliomyelitis virus, type 1 (Mahoney), type 2 (MEF-1) and type 3 (Saukett), respectively, were added to each serum dilution, kept for 30 to 60 minutes at room temperature, transferred to HeLa cell cultures, and incubated at 36° C. The end point of each titration was determined by microscopic observations on the fourth and seventh days as revealed by the tube with the last serum dilution completely protecting the cells from the cytopathic effect of the virus.

Results

Quantitative assay of 111 Brazilian serum samples for antibodies to poliomyelitis viruses by use of the HeLa cell tissue culture technique (13, 14) revealed for each of three socioeconomic groups comparable composite antibody spectrums as determined by occurrence and titer of antibodies (table 1). These data, by presenting the percentage distribution by socioeconomic groups of the occurrence of antibodies to each of the poliomyelitis viruses, types 1, 2, and 3, are brought out more clearly in table 2. Antibodies to all three types were found for 79 percent in group A, 53 percent in group B, and 29

percent in group C. Antibodies to at least one immunotype were demonstrated for all children in group A (average age 8 years), for 97 percent in group B (average age 11 years), and for 96 percent in group C (average age 18 years). The data provided from comparable studies of children (average age 6.5 years) of faculty members at the University of Minnesota (group D) and of University of Minnesota medical students in an age range of from 20 to 30 years (group E) were 15 percent and 16 percent, respectively. Conversely, data for the last two groups gave no evidence of poliomyelitis antibodies, (a) for 30 percent of the children less than 10 years of age, and (b) for 20 percent of the medical students from 20 to 30 years of age. These results from studies of subjects in Minnesota contrast with the results from the Brazilian population in which individuals less than 18 years of age, by socioeconomic group, range from 4 percent to none without antibody.

Discussion

The present observations establish the fact that poliomyelitis infection has been widespread in Rio de Janeiro and, presumably, in Brazil. Evidence was obtained of infection of most members of three widely different socioeconomic groups by at least 1 of the 3 antigenically recognized types of poliomyelitis virus. The percentage distribution of antibodies ranged from 96 to 100 percent. Indication of infection by all three types of poliomyelitis virus was found to vary from 29 to 79 percent in the three groups. The incidence and distribution of poliomyelitis antibodies in these three groups are similar to other areas of the world (9) with comparable sanitary, climatic, and hygienic conditions. On the other hand, a similar antibody survey for two age groups from Minnesota showed no antibodies in 30 percent of group D (average age 6.5 years) and 21 percent of group E (20 to 30 years of age). Antibodies to the three types of poliomyelitis virus were found to be 15 and 16 percent, respectively.

This serologic study shows that poliomyelitis infections have been widely disseminated in Rio de Janeiro. Presumably, the relative absence of poliomyelitis epidemics in Brazil can be explained in part by exposure to the viruses in

infancy at a time when children are under the protection of maternal antibodies.

Summary

Clinically recognizable poliomyelitis was accepted in Brazil as an endemic disease of sporadic occurrence until 1953. The disease in 1953 and 1954 assumed epidemic proportions. To provide information helpful to an understanding of the recent epidemic outbreaks in Brazil and of the global epidemiology of poliomyelitis, serologic evidence of the extent of previous poliomyelitis infections in Rio de Janeiro was obtained. Quantitative assay of poliomyelitis neutralizing antibodies in a sample of 111 serum specimens from three different socioeconomic groups (A, B, C) in Brazil was effected by using the HeLa cell tissue culture technique. For comparison, a group of University of Minnesota students (group E) and children of faculty members (group D) were studied. The common presence of antibodies to the three types of poliomyelitis viruses in the lowest socioeconomic section of the Brazilian population (group A) by the eighth year led to the conclusion that, presumably, the relative absence of poliomyelitis epidemics in Brazil can be explained in part by exposure to the viruses in infancy at a time when children are under the protection of maternal antibodies.

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Analysis of the cancer nursing service in the Nassau County (N. Y.) Department of Health suggests criteria that may be useful to other health departments in appraising a cancer nursing program or as goals to strive for in such a program.

Appraising Cancer Nursing Services

—A Study to Establish Criteria—

By E. DOROTHY GORDON, R.N., B.S., VINCENT H. HANDY, M.D., M.P.H.,
FRANCES TITUS, R.N., and EARLE G. BROWN, M.D.

CANCER as a disease has long been known to mankind. Only comparatively recently, however, has cancer been generally recognized as a public health problem. In New York State, as in the Nation, cancer now ranks second only to heart disease as a cause of death. In 1953, cancer had an incidence of 281.3 reported cases per 100,000 population and a death rate of 170.4 per 100,000 population in New York State, exclusive of New York City. In view of the size and seriousness of this public health problem, the New York State Department of Health's bureau of cancer control has consistently encouraged local departments of health to develop progressive, integrated programs of cancer control, including public health nursing services.

Nursing has always had a significant contribution to make to the care of patients with

cancer, and public health nursing is peculiarly fitted to play an important role in modern-day cancer control. Public health nursing services can be expected to assume an even greater importance in cancer control programs as public health agencies give increasing attention to all the chronic diseases.

If local health departments are to develop cancer nursing services in an orderly manner, periodic, systematic appraisal of the programs is necessary. For such an appraisal, some criteria by which the programs can be measured to indicate achievements and uncover areas for further development would seem to be required. Therefore, during 1952 and 1953, the New York State Health Department's bureau of cancer control and the Nassau County (N. Y.) Department of Health undertook a study aimed at establishing criteria that could be used in appraising cancer nursing services.

The approach to the problem consisted in an attempt to find out what the essential elements of cancer nursing are as carried out in a specific area, with reference to the following questions:

1. What type of cancer patient is receiving home nursing care?
2. What is the extent of nursing care being given to the patient?
3. Can this information suggest criteria for appraising a cancer nursing program?

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Study Methods

Nassau County was selected as the area for study for several well-defined reasons.

First, it has an active, well-organized health department.

Second, the health unit has not only an active caseload of nursing visits to cancer patients, but also a sufficient number of patients and visits for valid conclusions to be drawn.

Third, its nursing records are reasonably complete and are readily available for study.

Fourth, in addition to a public health nursing service, other community resources, including hospital, clinic, and ancillary services, are available within or close to the area for assistance in the total care and rehabilitation of cancer patients.

Finally, diagnostic reports are accessible and completely reliable. It was agreed early in the planning period of the study that only those patients for whom a diagnosis of cancer had been made and reported to the health department prior to referral for nursing service would be included. This decision eliminated study of one of the nurse's most valuable contributions to the cancer control program, that is, followup of the "suspected" case until cancer is diagnosed or ruled out. However, it was felt that for the primary purpose of this study, only diagnosed cancer patients should be included, in the interests of accuracy and reliability of the data.

In addition to meeting these general requirements, Nassau County has three specific characteristics which make it an appropriate locale for the study.

First, there is sustained professional and public interest in cancer, as shown by the formation in 1928 of the Nassau County Cancer Committee, and later the appointment of a health educator to its staff, and by the establishment of a tumor clinic in the county hospital in 1932.

Second, the public health nursing service of the Nassau County Health Department reaches a large percentage of reported cancer cases. Since its inception in 1938, the nursing service has been generalized, with each staff nurse giving service to any person in her area referred for health supervision and nursing care in the home. In 1940, it became apparent that the nurses needed more specialized knowledge of

cancer, and a comprehensive inservice education program was started. This program has been continued regularly since that date.

Third, the county health commissioner possesses a firm conviction that cancer nursing is an integral part of and a legitimate function of a comprehensive, generalized public health nursing service, and that as emphasis in public health shifts toward the chronic diseases, the same trend should occur in public health nursing. He and his staff have worked steadily and imaginatively to create and develop good rapport between the county health department, the county cancer committee, and local practicing physicians.

The success of the Nassau County Health Department's approach is reflected in the referrals of cancer patients to the public health nursing service. During the period July 1, 1952, to June 30, 1953, 488 new cancer patients received nursing service out of 1,599 cases in the county reported before death, a percentage of 30.5. The average for upstate New York was 14.1 percent, exclusive of patients receiving care from visiting nurse associations.

The proportion of cancer patients to the total number of patients receiving nursing services is even more interesting. During the same 12 months, the Nassau County Health Department provided nursing services for 21,833 patients. Of these, 626, 2.8 percent, were cancer patients (including both new patients and those readmitted to service). In the rest of New York State, exclusive of New York City, 737 cancer patients received nursing care from the official agencies out of 83,587 patients carried for all nursing services, a percentage of 0.8. The difference between the makeup of the nursing load in Nassau County and that of the rest of the upstate area is statistically significant.

The time period selected for the study was July 1, 1952, through September 30, 1953. One hundred thirty-six new cancer patients consecutively admitted to nursing service during the first 12 months of that period composed the study population. Some difficulty was experienced in accumulating this number of patients for study because frequently patients were referred for nursing service before a definite diagnosis was made. Only those patients for whom a definite diagnosis of cancer had been made

Worksheet Used for Recording Data

Village or city:		County:	Name:		Diagnosis:	
Age:	Sex:	Date referred to nurs. serv.:	Date first visit by nurse:		Total visits:	
Referred by: Hospital <input type="checkbox"/> Private physician <input type="checkbox"/> Other agency <input type="checkbox"/> Family or friend <input type="checkbox"/> Self <input type="checkbox"/>				Referred for:		
Classification: Surgical <input type="checkbox"/> Nonsurgical <input type="checkbox"/> Radiation <input type="checkbox"/>		Stage: Early <input type="checkbox"/> Late <input type="checkbox"/>	Status: Ambulatory <input type="checkbox"/> Part-time ambulatory <input type="checkbox"/> Bedridden <input type="checkbox"/>	Date _____ _____ _____	Disposition of case: Died <input type="checkbox"/> Discharged to hospital <input type="checkbox"/> family <input type="checkbox"/> other <input type="checkbox"/> Active <input type="checkbox"/>	

NURSING SERVICES							
Physical Care	Given by Nurse	Dem. to Pt.	Dem. to Fam.	Super-vised	Supportive Care	Dir. to Pt.	Dir. to Fam.
General care (full or partial)					Motivate to medical care		
Dressings					General health instruction (nutrition, etc.)		
Enema					Referral to other agencies		
Irrigations					Followup nursing supervision		
Diet and special feedings					Emotional support		
Injectons					Assistance with special problems		
Rehabilitation procedures					Other (specify)		
Sitz bath							
Surgical assistance to doctor							
Tracheotomy, laryngectomy care							
Tube feeding (nasal, gastric)							
Vaginal douche							
Other (specify)							

and reported to the health department prior to referral for nursing service were included in the study group.

The nursing service for each patient was studied for 3 months, unless the patient died or was discharged earlier. A worksheet, shown above, was devised for recording the desired data and was completed for each patient in the study. The data were obtained almost exclusively from the nurses' records; interviews with nurses for the collection or supplementation of data were kept to a minimum.

Sex Distribution and Leading Sites

The sex distribution of the patients in the study favored females. Eighty-one, 59.5 percent, were females, and 55, 40.5 percent, were males. The distribution of all reported cancer cases in Nassau County in 1953 was more nearly equal; 48.3 percent of the cases were in males, and 51.7 percent were in females. It may be that more women than men received nursing service because the site of the cancer and the special needs of patients having cancer of cer-

Table 1. Distribution of nursing care patients according to site of cancer

Site	Males		Females		Total	
	Number	Percent	Number	Percent	Number	Percent
Intestine.....	11	20.0	17	20.9	28	20.6
Breast.....	0	0	20	24.7	20	14.7
Rectum-anus.....	7	12.7	8	9.9	15	11.0
Respiratory system.....	11	20.0	0	0	11	8.1
Skin.....	7	12.7	0	0	7	5.1
Cervix.....	0	0	6	7.4	6	4.4
Stomach.....	0	0	5	6.2	5	3.7
Prostate.....	5	9.1	0	0	5	3.7
All others.....	14	25.5	25	30.9	39	28.7
Total.....	55	100.0	81	100.0	136	100.0

tain sites determine which patients are referred for nursing care.

Cancer of every system and of most anatomical sites was represented in the study group. As shown in table 1, 5 sites accounted for about 60 percent of the nursing caseload: intestine, breast, rectum-anus, respiratory system, and skin. In Nassau County in 1953, the respiratory system and the intestine were the second and third most frequent sites of cancer among males, exceeded only by the skin; and the breast was the leading site of cancer among females. In the study group, patients with cancer of the intestine and those with respiratory cancer were the most numerous among the men, and patients with breast cancer were the most numerous among the women. These data indicate that the distribution of nursing care patients by site of the cancer tends to follow the distribution of all reported cancer patients.

Physical Care Services

Of 1,290 physical care services given, the women received 935 (72.4 percent), nearly 3 times as many services as the men. As previously stated, there were only about 1½ times as many women as men in the study group. One possible explanation for the preponderance of physical care services being given to the women is that the site of the cancer dictates the amount and kind of physical nursing care necessary. The data in table 2 tend to support this view.

Cancer of the respiratory system, one of the leading sites among the men, received only 3.8

physical care services per patient. This may be because of the limits to home nursing care imposed by cancer of this site. In general, the course of lung cancer, as compared with cancer of other sites, is of relatively short duration. Much of the treatment is given in the hospital, and upon discharge the patient may have little need of physical nursing care services.

On the other hand, cancer of the breast, the leading site among the women, may require a number of physical care services, such as dressings and rehabilitation procedures, to be given

Table 2. Number of physical care services according to site of cancer

Site, by sex	Number of patients	Number of services	Number of services per patient
<i>Males</i>			
Respiratory system.....	11	42	3.8
Intestine.....	11	147	13.4
Rectum-anus.....	7	28	4.0
Skin.....	7	29	4.1
Prostate.....	5	60	12.0
All others.....	14	49	3.6
Total.....	55	355	6.4
<i>Females</i>			
Breast.....	20	252	12.6
Intestine.....	17	237	13.9
Rectum-anus.....	8	73	9.1
Cervix.....	6	31	5.1
Stomach.....	5	52	10.4
All others.....	25	290	11.6
Total.....	81	935	11.5

Table 3. Number and percentage of physical care services

Service	Services for males		Services for females		Total services	
	Number	Percent	Number	Percent	Number	Percent
General care.....	90	25.3	197	21.1	287	22.2
Dressings.....	88	24.8	190	20.3	278	21.6
Irrigations.....	48	13.6	220	23.6	268	20.8
Injectons.....	60	16.9	187	20.0	247	19.1
Enemas.....	46	12.9	76	8.1	122	9.5
All others.....	23	6.5	65	6.9	88	6.8
Total.....	355	100.0	935	100.0	1,290	100.0

in the home. Breast cancer received 12.6 physical care services per patient, next to the highest number of services given to the women.

Considering all women patients and all men patients, however, we find that the women required an average of 11.5 physical care services as compared with 6.4 for the men. Possibly the reason for this difference lies in factors not revealed by the data collected for this study.

Table 3 shows that 5 types of service accounted for 93 percent of all physical care services given: general care, dressings, irrigations, injections, and enemas. For the men, general care was given most often; for the women, irrigations were most common. It should be noted here that one elderly woman in the group received an unusually large number of irrigations given by the nurse because it was not possible for a member of the family to assume complete responsibility. In this relatively small group studied over such a short period of time as 3 months, it is possible that 1 or 2 patients may influence the statistical picture to a disproportionate degree.

Supportive Care Services

It is difficult to make a division between physical care services and supportive care services in evaluating total nursing services. For the purpose of collecting and analyzing the data, an attempt was made in this study to make such a division, but for interpreting the data it is necessary to bear in mind certain intangible factors that operate significantly in good nursing care. For example, it is hard to imagine a good nursing visit made for the purpose of

Table 4. Distribution of supportive care services according to site of cancer

Site, by sex	Number of patients	Number of services	Number of services per patient
<i>Males</i>			
Respiratory system.....	11	19	1.7
Intestine.....	11	37	3.4
Rectum-anus.....	7	16	2.3
Skin.....	7	14	2.0
Prostate.....	5	4	.8
All others.....	14	44	3.1
Total.....	55	134	2.4
<i>Females</i>			
Breast.....	20	32	1.6
Intestine.....	17	51	3.0
Rectum-anus.....	8	22	2.8
Cervix.....	6	14	2.3
Stomach.....	5	12	2.4
All others.....	25	92	3.6
Total.....	81	223	2.7

giving a bath or doing a dressing that does not also include some awareness by the nurse of the patient as a person, with his emotional needs and responses peculiar to himself at that time.

Of 357 supportive care services given, women received 223 (62.5 percent), and men, 134 (37.5 percent). This follows fairly closely the sex distribution of the study group.

Table 4 shows that there was little difference between the sexes when the distribution of supportive care services by site was studied. The men averaged 2.4 supportive care services; the women, 2.7. As with physical care services, the number of supportive care services per pa-

Table 5. Number and percentage of supportive care services

Service	Services for males		Services for females		Total services	
	Number	Percent	Number	Percent	Number	Percent
Emotional support.....	49	36.5	81	36.3	130	36.4
General health instruction.....	39	29.1	55	24.7	94	26.3
Assistance with special problems.....	21	15.7	39	17.5	60	16.9
All others ¹	25	18.7	48	21.5	73	20.4
Total.....	134	100.0	223	100.0	357	100.0

¹ Includes motivation to medical care, referral to other agencies, followup nursing supervision, and other services.

tient tended to be more affected by site of the cancer than by sex of the patient. Cancer of the intestine, for example, required the most supportive care, regardless of the sex of the patient.

According to tables 2 and 4, approximately 3½ times as much nursing service was devoted to the physical care of the patient as to his supportive care. As previously noted, however, it is next to impossible to divorce physical care from supportive care. It is very probable, therefore, that more supportive care was given than would be indicated by the nurses' records. Good nursing care includes recognizing and attempting to meet the emotional needs of the patient as well as the physical needs. But so much of supportive care is incidental, if not

perhaps unconscious, that nurses usually do not record it. This is unfortunate since the public health nurse is especially trained to assist in those services listed as supportive. Unless it is clearly understood and accepted that this service is an important and integral part of her function, many persons may be led to assume that physical care services alone constitute an adequate nursing visit and that the visit can thus be made by someone with less formal training. For the maximum service to the patient, complete nursing care must include both physical and supportive care to the degree indicated by the needs of the patient.

The most interesting finding revealed by table 5 is that three general types of supportive service—emotional support, general health instruction, and assistance with special problems—comprised approximately 80 percent of all supportive services. Furthermore, with minor deviations, these three types were about equally distributed among men and women.

Table 6. Number and percentage of nursing care services according to specified classifications

Service	Services for males		Services for females	
	Number	Percent	Number	Percent
<i>Physical care</i>				
Given by nurse.....	286	80.5	820	87.7
Demonstrated to patient or family.....	39	11.0	67	7.2
Supervised.....	30	8.5	48	5.1
Total.....	355	100.0	935	100.0
<i>Supportive care</i>				
Directed to patient.....	76	56.7	156	69.9
Directed to family.....	58	43.3	67	30.1
Total.....	134	100.0	223	100.0

Extent of Nursing Care

One measure of the extent of nursing care was obtained by tabulating physical care services according to three classifications as shown in table 6: services given by the nurse, which included care given to the patient in which demonstration or teaching was incidental rather than a primary objective; services demonstrated to the patient or family, which included care given by the nurse to show how to do a procedure, the eventual goal being to have the patient or his family assume this responsibility; and services supervised, which included the nurse's visit to observe a procedure, answer

questions, and evaluate the situation after the patient or family had assumed responsibility for care.

A large percentage of the physical care services were actually administered by the nurse, and only a small percentage were demonstrated to the patient or family. Although this was true for both men and women, a higher percentage of services were demonstrated for the men than for the women. One explanation for this difference might be that a wife is more likely to assume nursing duties when her husband is ill than is a husband when his wife is ill. It was also found that a large proportion of the study group were in the late stage of the disease. Nearly a third of the patients died within 3 months after admission to nursing service. It can probably be assumed that a great many of the patients were already too ill and the family already too exhausted physically and emotionally for anyone but the professional nurse to undertake the patient's care.

"Services supervised" should be one indication of the patient's or family's degree of success in achieving self-sufficiency. The nurse was satisfied that self-sufficiency had been attained in 8.5 percent of the physical care services for men and in 5.1 percent for women.

Table 6 also shows a tabulation of supportive care services according to services directed to the patient and services directed to the family. More of the services fell into the first category than the second for both men and women. This finding may be a demonstration of a desirable principle of nursing care, that is, help the pa-

tient to help himself first and thus aid him in establishing independence and security.

The women patients received a higher percentage of supportive care services directed to themselves (69.9 percent) than did the men (56.7 percent). It may be that in many instances other members of the family were at places of employment outside the home at the time of the nurse's visit. However, it was the exceptional patient who lived alone.

Age, Referrals, and Disposition

The men in the study group tended to be older than the women, with 92.8 percent of the men over 45 years of age compared with 77.8 percent of the women. However, the number of visits per patient was higher in each age group for women than for men. The greatest number of visits per patient occurred in the 25-34 age group for women, but there were very few patients in this group. The data on age and number of visits are shown in table 7.

As shown in table 8, 88 patients (65 percent) were visited by the public health nurse on the day of referral, and 104 (76.4 percent), within 2 days. Seventeen patients (12.5 percent) were not visited until the ninth day or later. A local situation in the county may have some bearing on this last finding. Fourteen of these seventeen patients were referred by the local hospital, which has a tumor clinic. All patients attending the clinic are referred to the health department nursing service for followup or because of missed clinic appointments. The

Table 7. Age distribution of patients and number of nursing visits

Age, in years	Males				Females			
	Number of patients	Percent	Number of visits	Visits per patient	Number of patients	Percent	Number of visits	Visits per patient
Under 24.....	2	3.6	5	2.5	1	1.2	13	13.0
25-34.....	0	0	0	0	3	3.7	43	14.3
35-44.....	2	3.6	9	4.5	14	17.3	168	12.0
45-54.....	6	10.9	24	4.0	12	14.9	89	7.4
55-64.....	23	41.9	216	9.4	21	25.9	266	12.7
65-74.....	11	20.0	89	8.1	15	18.5	183	12.2
75 and over.....	11	20.0	50	4.6	15	18.5	163	10.9
Total.....	55	100.0	393	7.1	81	100.0	925	11.4

Table 8. Time interval between referral and first nursing visit according to source of referral

Source of referral	Time interval				Total	
	Same day	2 days	3-8 days	9 or more days	Number	Percent
Private physician.....	51	10	8	3	72	52.9
Hospital.....	28	2	6	14	50	36.8
Other.....	9	4	1	0	14	10.3
Total.....	88	16	15	17	136	100.0

patient's clinic return date may be a considerable time after the date referral to the nursing service is made, and these referrals receive no priority in the public health nurse's schedule. Therefore, the nurse may delay her first visit until near the time of the patient's clinic appointment. If immediate nursing were needed, the referral notice would so indicate. With the exception of these 17 patients, the time interval between referral and first nursing visit was fairly consistent for the various sources of referral.

Table 8 also gives the number and percentage of patients referred by each source. Of the 72 patients (nearly 53 percent) referred by private physicians, 46 were women and 26 were men, a male to female ratio slightly more in favor of women than the sex distribution of the study group. Of the 50 patients (36 percent) referred by the hospital, women numbered 26, and men, 24. Other sources, which accounted for only 14 of the patients, included self or family.

A striking fact revealed in table 9 is that, of the 135 patients for whom the stage of disease was known, 121 (89.7 percent) were in the late stage when diagnosed. Only 14 (10.3 percent) were in the early stage. In 1953, Nassau County reported 1,900 new cancer cases. The physician designated the stage of disease at time of diagnosis in 1,603 of these. Of this group, 334 (20.8 percent) were cases in the early stage of disease.

The fact that a preponderance of the cases referred for nursing service were late cases may have significant implications for nursing. If we believe nursing as well as medicine can make its maximum contribution to the welfare of the patient during the early stage of a disease,

then obviously the opportunity diminishes as the disease progresses. But physicians may feel that the patient should be maintained without nursing supervision in the home until the late or even terminal stage has been reached. Table 9 shows that 42 patients (30.9 percent) died within 3 months after referral (the period of study of each patient), a finding that appears to lend support to this theory. Possibly physicians do not wish some patients to know or even suspect the diagnosis of cancer and feel that referral for nursing care early in the course of the disease might arouse the patient's anxieties. Or perhaps patients are referred for health department nursing care only after the family has exhausted its own resources, both physical and emotional.

Table 9 also reveals that 37 patients, 27.2 percent, were discharged to themselves or their families. It may be inferred that these patients had achieved enough self-sufficiency to be responsible for their own followup, subject,

Table 9. Disposition of patients by stage of disease at time of diagnosis

Disposition	Stage of disease ¹		Total	
	Early	Late	Number	Percent
Died.....	1	41	42	30.9
Discharged to hospital...	3	11	14	10.3
Discharged to self.....	4	16	20	14.6
Discharged to family....	2	15	17	12.5
Discharged to private duty nursing.....	0	2	2	1.5
Active.....	4	36	41	30.2
Total.....	14	121	136	100.0

¹ Stage of disease unknown for one patient.

of course, to regular medical supervision. If those patients who died are excluded from the calculations, then the percentage of patients who achieved self-sufficiency is 39.4. This finding is especially gratifying since 89.7 percent of the patients were already in an advanced stage of the disease when referred for nursing service. Forty-one patients, 30.2 percent, were still receiving visits at the end of the 3-month period of study.

Criteria and Goals

From this study and from the Nassau County Health Department's experience emerge certain findings which we believe may be useful to health officers as criteria for evaluating a cancer nursing service or as goals to strive for in such a program, even though the study group was small and the study period short. These findings have been divided into two groups: group A, those that may be reproducible elsewhere, that is, those that should not be influenced by local conditions; and group B, those that may be peculiar to this county because of local circumstances but that we feel indicate a good quality of service and are therefore desirable in a well-integrated cancer nursing program.

GROUP A

1. At least 30 percent of the reported cancer cases, exclusive of those reported at time of death, are receiving public health nursing service.
2. At least 2 percent of the total patients carried for public health nursing are cancer patients.
3. The distribution of cancer patients referred for nursing service, both male and female, corresponds to the distribution of the predominating cancer sites of all patients in the locality.
4. The site of the cancer, rather than the sex of the patient, largely determines the number of physical care services and supportive care services given.
5. Physical care services constitute an important part of the cancer nursing visit. They con-

sist predominantly of general care, dressings, and irrigations.

6. Supportive care services also constitute an important part of the cancer nursing visit. They consist predominantly of emotional support and general health instruction.

7. One measure of the effectiveness of the nursing service is the proportion of patients discharged either to themselves or their family.

GROUP B

1. In a health department where there is effective cancer reporting and an established nursing service and where there is a genuine desire to provide nursing services for chronic disease patients, 30.5 percent of the reported cancer cases, exclusive of those reported at time of death, are receiving nursing care. This cancer caseload constitutes 2.8 percent of all cases carried for nursing service.

2. The public health nurse visits 76 percent of the referred cancer cases within the first 2 days.

3. Referrals for nursing service present the following pattern: 53 percent by private physician; 37 percent by hospitals; 10 percent by self, family, or other community agency.

4. Twenty-seven percent of the patients are discharged either to themselves or their family within 3 months after the nurse's initial visit. When those patients who die are excluded from this calculation, 39.4 percent of the cases achieve this measure of self-sufficiency.

5. The average number of visits per cancer patient ranges between 7 and 12, depending on age and sex of the patient.

It is not realistic, of course, to expect other health departments to arrive at exactly the same results in appraising their cancer nursing programs as were found in Nassau County. But the health officer may find these criteria and goals helpful in reviewing his cancer nursing program. In the course of such an appraisal, he should honestly ask himself what factors are governing his cancer nursing service. Is it a token service to satisfy community pressures? Is it dependent upon the interest of only a few nurses? Or is it a planned program within the framework of his public health objectives?

idea

Modified Oscilloscope

Monitoring a patient's blood pressure and electrocardiogram in difficult heart surgery has vital significance to the surgeon and anesthesiologist. The usual monitoring device is a cathode-ray oscilloscope. These oscilloscopes are expensive, often bulky, and because of an excessive number of controls, rather difficult to operate.

These disadvantages have recently been reduced by a modification of this instrument by F. W. Noble, M.E.E., B. R. Boone, M.D., N. McC. Garrahan, and R. E. Gorman of the National Heart Institute, National Institutes of Health, Public Health Service.

The National Heart Institute announced the successful application to an electrocardiograph machine of a version of an electronic switch that makes possible the adaptation of all existing single-beam oscilloscopes to perform like more complex double-beam instruments.

Though the cheaper and more frequently available single-beam oscilloscope has only one light source, with the addition of the electronic switch, it traces two curves on the screen. This is achieved by a rapid redirection and alternation of the light source between the curve above and the curve below. The switching process continues indefinitely, leaving behind two separate and distinct tracings.

A detailed technical description of the switch appears in the September 1955 issue of *The Journal of Laboratory and Clinical Medicine*.



Malaria Control in Turkey

By FREDERICK W. KRATZ, M.D., and
C. BRADLEY BRIDGES, M.P.H.

TURKEY—astride the strategic Bosphorus and Dardanelles—has long been a land of mystery and enchantment to the average American. Its civilization is what one would expect of a country which lies partly in Europe and partly in Asia. Though turned toward the West in thought and ideas, it is a nation blending the customs of Eastern and Western cultures in spite of the prediction that "ne'er the twain shall meet."

Asia Minor, or Asiatic Turkey, is about 97 percent of the total land area of the country (287,246 square miles). Thrace, the extension of the European Balkan Peninsula, occupies only about 3 percent. Both portions of the once great Ottoman Empire are historically malarious. The Sultan's soldiers, returning from World War I to rally around Kemal Ataturk, not only maintained malaria in epidemic proportions but brought with them strains of new plasmodia, which swept through the homeland with renewed energy (1, 2).

In the years since the founding of the Repub-

lic of Turkey, in 1923, great emphasis has been given to improvement of the general health. Malaria incidence has been in general decline since 1946 as a result of the persistent control operations under the Directorate of Malaria Control (3). These efforts had long been hampered by general shortages of funds, equipment, and insecticides.

In May 1950 the United States Economic Cooperation Administration Health Mission to Greece sent representatives to Turkey in order to establish the basic agreements which led eventually to a program of material and technical assistance in malaria control.

In November of the same year a working agreement was set up between the Economic Cooperation Administration and the Turkish Ministry of Health and Social Assistance. The ECA public health group, composed of a physician, sanitary engineer, and malariologist, arrived in Ankara in March 1951 to work as consultants in the malaria control operations of the Turkish Ministry of Health until the close of the assistance program, June 30, 1953.

Material assistance furnished under these agreements included principally insecticides, sprayers, and automotive equipment.

Progress in International Cooperation

Turkey has four separate topographical regions whose climates are completely different. Each region presents its problems in the control of malaria.

Asiatic Turkey is almost completely ringed with mountains which fall away rapidly toward

Dr. Kratz and Mr. Bridges went to Turkey in 1951 as public health consultants. Dr. Kratz, who is medical officer in charge, Pacific Northwest Foreign Quarantine District, Public Health Service, Seattle, was chief of the public health group during the malaria control program. Mr. Bridges was the malariologist with the group and is now training officer at the Communicable Disease Center, Public Health Service, Atlanta. The third member of the group was George W. Hintgen, malaria control engineer.

the sea, forming a strip of flat coastal plain of varying width. This plain is adjacent to the Black, Marmara, Aegean, and Mediterranean Seas. European Turkey is also a coastal plain since it is the corresponding area between the Balkans and the Black, Marmara, and Aegean shores.

Malaria has been firmly entrenched in the coastal plain for centuries. This is particularly true of the Aegean and Mediterranean areas where Greek and Roman cities suffered the ravages of the disease. Its ample rainfall and mild-to-tropical climate make it still the area requiring most attention.

The watershed from the coastal side of the mountains, the flood plains of great rivers entering the sea, and the outcropping of the water table furnish ample mosquito-breeding habitats in the form of pools, marshes, and seepage areas. In the south the mosquito-breeding season is continuous, with only minor recessions in winter. Progressing northward, more definite seasonal lines may be drawn.

More than half the land area of Turkey is in Anatolia, a high, saucer-shaped plateau, much like the arid plateaus just east of the Rocky Mountains in the United States. Anatolia, the Turkish homeland, may be called the heart as well as the breadbasket of the country.

The winters are cold and the summers are hot with cool, breezy nights. Continuous warm weather does not begin until very late spring, confining mosquito breeding generally to the months from June to October. Dry summers limit malaria transmission to areas adjacent to water courses or to the numerous brackish marshes and lakes. Villages are, of necessity, located near water sources, thereby making malaria control services obligatory in most areas of Anatolia. The necessity of irrigation is general. However, the annual grain crop is largely dependent on the heavy snow and rain of winter.

Since large parts of Anatolia are not drained by the big river systems, runoff water often accumulates in large marshes and lakes. This makes wasteland of vast areas. Spring floods expand their size enormously, and summer drought greatly reduces them, leaving crusty layers of mineral salts after the water evaporates.

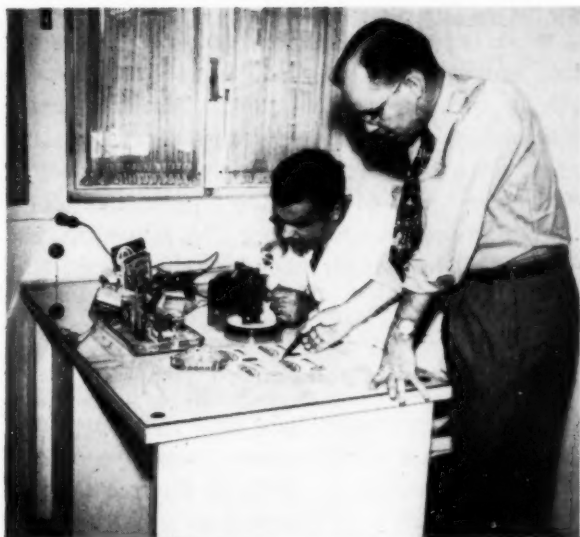
The rugged mountain country of eastern Anatolia has narrow, fertile valleys where good crops of grain and fruit are grown. The severe winters, short summers, and restricted breeding areas place natural limitations on malaria. Southeast Anatolia is a foothill region where the mountains decline to the rolling hills of Syria, Iraq, and Iran. Primitive living conditions plus long, hot, dry summers, which are relieved by heavy autumn, winter, and spring rains, make malaria control measures necessary. Some of the highest spleen rates are reported from southeast Anatolia.

Prior to the arrival of Osmanli, or Ottoman Turks, in the 11th century A. D., the residual population of Asia Minor was subjected to the sweeping tides of conquests from both the East and the West. Almost any racial characteristic can be found from the Mongoloid to the Nordic, but the people are predominantly of the Mediterranean type. The highest population densities are found in the approaches to Europe, that is, the Marmara and Black Sea coastal plains. Not only are many of the larger cities located there, but the towns and villages are larger and more numerous.

Turkey is predominantly a rural nation. Only 7 percent of its population lives in the urban centers above 50,000 in population. The term "rural" as applicable to the United States cannot be used here. Isolated homesteads are nonexistent. The entire population lives in communal groups from small villages to larger towns and cities. In the United States we speak of malaria as being a rural problem, but in Turkey it is a village problem.

Malaria has no doubt played a leading role in shifting greater densities to the Marmara and Black Sea coasts. Along the Aegean there have been Roman and Greek cities of fabulous size and grandeur—Troy, Ephesus, Perga, Aspendus, Soli, and Korykos. They are ruins today, mute evidence of the combined influence of malaria, decadence, and earthquakes. Even in recent years, Antalya, the modern counterpart of Perga, has reported malaria rates as high as 85 percent (1).

A large majority of the people are engaged in various agricultural pursuits, which include herding livestock as well as intensive cultivation of small vegetable farms. Through the



Studying the biology of vectors.

years activity patterns have evolved which substantially increase the opportunity of malaria transmission in the presence of capable vectors.

The sparse summer rainfall in most of Turkey necessitates the extensive use of irrigation during the growing season. The improper management of irrigation water in rice culture and in other crops leads to a malaria problem here as well as elsewhere in the world.

The danger from rice irrigation is somewhat reduced by a law which requires that all rice fields less than 3 kilometers from a village be dried 48 hours every 10 days, but there is no such control on water used in irrigation of other crops to lessen mosquito breeding (4).

The lack of fences in Turkey has led to the custom of crop watching. During fruiting time a watch is maintained from an elevated platform day and night against marauding men and livestock. The guard is often joined by his entire family. With a most convenient blood meal near at hand, the vectors need not travel to the villages or herds to fill their needs. A similar blood-feeding situation results when the people sleep on rooftops to escape the inside heat on hot summer nights.

As in the United States, laborers migrate from one area to another during the harvest season. They live in tents or other temporary dwellings impossible to cover in a control program, then return when the harvest season is over to their Anatolian homes, carrying infec-

tions with them. Migrations of a lesser magnitude are those of a few nomadic tribes who follow grazing as the seasons open or close.

The Malaria Control Organization

Owing to the prevalence of malaria in Turkey in the period following World War I and the early days of the Republic (5), malaria control activities were begun on a national level by the Ministry of Health and Social Assistance in 1925.

Studies of the mosquito fauna in those years established the presence of such formidable vectors as *Anopheles superpictus* as well as *Anopheles sacharovi*. Although the existence of three subspecies of *Anopheles maculipennis* was also established, these subspecies (*typicus*, *messeae*, and *melanoon*) were fortunately not the efficient vectors of southern Europe (6). Seven other *Anopheles* were established, namely, *algeriensis*, *claviger*, *marteri*, *multicolor*, *plumbeus*, *sergentii*, and *hyrcanus* (7).

The malaria workers of the Directorate of Hygiene enjoyed reasonable progress until the World War II period. Economic crises and shortages brought widespread epidemics to the Mediterranean and Aegean areas. In 1946 malaria control was set up as a separate division for the administration of the program. The National Assembly gave legal authority to the new agency to control malaria by almost any effective means (4).

Operating at a high federal level, the directorate, under the Ministry of Health and Social Assistance, carried out its program through



Examining patient for spleen enlargement.

provincial and district medical directors at the local area. This same type of organization is still in existence. With the advent of United States cooperation, new areas were included in the control program.

The sanitarian is the key man at the local level. Though subprofessional by training and experience, he is responsible for substandard diagnostic screening of malaria cases, the dispensing of antimalarial drugs, entomologic inspections, the supervision of residual spraying and larviciding, and the gathering of statistical data. He is directly responsible to a medical officer, who either substantiates or disproves the diagnoses made by the sanitarian. A sanitarian is assigned to 10 to 15 villages and is required to visit each village twice a month on schedule.

The Directorate of Malaria Control is administratively in control of the Malaria Institute in Adana, which is its training arm. Inservice training is generally given at three different levels.

1. Physicians are given a 6 weeks' course in all phases of malaria work from diagnosis to insecticide dispersal. On returning home, they give similar courses for their associates in the district and throughout the province.

2. Laboratory technicians are given training for a similar period in the preparation and identification of blood parasites as well as taxonomy of mosquitoes and other insects.

3. Sanitarians' inservice refresher courses usually are of 4 weeks' duration. Designed to meet the needs of sanitarians in the field, the subjects are approached from a practical point of view. Although coverage is given to all phases of malaria control activities, particular emphasis is given to insecticides, their use, and application. A formal 3-year course in all phases of sanitation activities prior to service in the various directorates is continually improving the quality of sanitarians. The supply of these graduate sanitarians does not fulfill the needs of the Ministry of Health.

At local and national levels inservice training of the older and nongraduate sanitarians is a major endeavor aimed at raising their efficiency in the broad field they cover in addition to the malaria control program.

During the period of United States assistance in malaria control, these courses were a cooperative enterprise. The Public Health Service officers were instructors at the Malaria Institute. Such joint undertakings served to improve working relations and to promote a deeper understanding of existing problems. The courses, more than anything else, served to disseminate information quickly to the operational level.

Malaria Control Operations

Examination and treatment of suspected cases of malaria have been mainstays of the operational program. During the normal season, a sanitarian on his routine visits to each village makes the diagnoses and issues anti-malarials, usually atabrine. Guided by an operational manual, he maintains records dealing with every occupant of each house in the village. Such pertinent data as splenic enlargement, results of blood examinations, and age and sex of the occupants are recorded. The examinations of blood for malaria parasites are made by the local physicians and technicians assigned to the malaria control program.

Since 1946, a malaria survey has been made each fall by the district medical director in each village of the 34 control areas. Great emphasis has been placed on enlarged spleens as an index to the prevalence of malaria. Since 1951, more emphasis has been placed on blood examinations. Before this period, blood examinations

Table 1. Data on Turkish spleen examinations, 1946-54

Year	Population in control areas	Percent examined	Percent with positive spleens
1946-----	6, 032, 573	78. 1	25. 9
1947-----	6, 036, 073	73. 9	19. 8
1948-----	6, 403, 475	70. 3	14. 7
1949-----	5, 398, 767	80. 1	10. 5
1950-----	5, 307, 420	85. 6	7. 1
1951-----	5, 717, 394	90. 9	4. 3
1952-----	5, 983, 502	75. 5	2. 1
1953-----	(1)	(1)	² 1. 4
1954-----	(1)	(1)	² 1. 1

¹ Figures not available. ² Percentages [of positive spleens taken from reference 8.

Table 2. Percent of total hospital admissions and deaths among malaria admissions, 1946-51

Year	Percent of admissions	Percent of deaths
1946.....	5.0	2.6
1947.....	3.6	2.4
1948.....	3.2	2.0
1949.....	2.7	1.6
1950.....	1.6	1.4
1951.....	1.4	1.1

Table 3. Progress in reduction of malaria incidence, 1946-52

Year	Spleen index	Percent reduction
1946.....	25.9	-----
1947.....	19.8	24
1948.....	14.7	26
1949.....	10.5	28
1950.....	7.1	30
1951.....	4.3	54
1952.....	2.1	40

were confined to persons having highly indicative clinical symptoms. Presently these surveys cover:

Spleen examinations for all inhabitants of village included under malaria control.

Blood smears on all children up to 10 years of age.

Blood smears on all persons having positive spleens.

Owing to the fact that the results of blood and spleen surveys through the years cannot be correlated, only the results of the spleen examinations have been tabulated. Blood examinations were done for the past 5 years, and spleen surveys were carried on for 27 years. Tables 1-3 cover only the results of village or rural examinations. There are clinics in the cities and large towns where people seeking medical treatment are examined. Should these reports be included, the population protected would be more than 9 million, or nearly half the total population.

Since some 80 percent of the malaria reported in Turkey is caused by *Plasmodium vivax* (1), Turkish physicians are accustomed to have between 20 percent and 30 percent of their treated

patients relapse under the present system of therapy. Any new drug on the market that can reduce this relapse rate is looked upon with great anticipation. The efficacy of primaquin with chloroquin has been covered in numerous training courses and conferences. The adoption of the use of more effective antimalarials is further hindered by the fact that a large stock of atabrine was brought from Egypt in 1951.

Vector Control

The success of any control measure in Turkey is dependent on how well the measure ties in with the habits of *A. sacharovi* and *A. superpictus*. Although there are anopheline vectors (*A. claviger*, *A. bifurcatus*, and *A. sergentii*) present which are of importance in other areas, in Turkey they are of secondary importance. Village houses are used to shelter animals as well as humans. Readily available animals for blood meals doubtless form protective barriers around man which are penetrated mainly by those primary vectors (*A. sacharovi* and *A. superpictus*) which show a definite preference for human blood.

Several of these anophelines have characteristics so similar that the species are separated only with difficulty. Identification involved time and equipment out of proportion to our systems. A primary accomplishment of the period of United States cooperation was the development of a simple pictorial key by which species could be separated in the field with a hand lens.

A program of routinely collecting larvae and adult mosquitoes was introduced also. Morbidity records have existed for some time. By correlating records of morbidity and vector indexes, justification for control operations can be established.

Since limited amounts of DDT were available for malaria control in the past, considerable emphasis was placed on oil larviciding of breeding areas. DDT first became available to Turkey in 1946, beginning with 2 tons, and gradually increasing to almost 100 tons in 1949. As more DDT became available from United States aid (750 tons a year for the next 3 years), larvicides were deemphasized, and DDT residual spraying assumed a more important role.



Mixing spray materials.

Where larviciding is indicated, it is accomplished with the use of a DDT solution made with fuel oil to which a spreading agent was added. Applications approximating 1 gallon an acre (0.1 pound DDT) in a fine mist spray are the rule.

Heavier residual larvicidal applications with DDT emulsions (3 pounds an acre) are used in selected locations on isolated ponds. Since many of these ponds dry up in midsummer, a single application will suffice for the season. These applications result in a considerable saving in the cost per acre-week over the older oil-larviciding methods.

Major drainage works are the responsibility of the Turkish Ministry of Public Works. Since the ministries coordinate their drainage projects through this agency, drainage on a large scale for malaria control alone does not occur. It is usually tied in with such projects as land reclamation, but still the benefits extend to malaria control.

Malaria control workers are trained in the fundamentals of drainage which they apply on a local level in small hand drainage proj-

ects. The effectiveness of residual spraying in controlling malaria has largely reduced drainage operations to the maintenance of existing ditches and small channels.

DDT Residual Spraying

Malaria in Turkey can be controlled by directing control activities only at the mosquitoes which play a role in the actual transmission of the disease. This principle of control by "species sanitation" requires a deeper understanding of the life history and habits of the vectors so that an attack can be made at a vulnerable point. The purpose of DDT spraying in homes is to control the vectors at the point where blood meals are taken from man, and where the accompanying transfer of parasites takes place, that is, in homes where humans are attacked during sleeping hours or other periods of inactivity.

The most important vectors in Turkey enter barns and houses in search of victims from which a blood meal may be taken. Sometime during this sojourn the anopheline will seek a quiet dark place in which to rest. This rest may come after its flight from the breeding area or after it has heavily gorged on the victim's blood. If DDT residues have been applied to every likely resting place, the infected mosquitoes are killed, breaking the chain of transmission.

DDT spraying on this basis has given protection to more than 9 million people each year since American aid was instituted in 1951. This assistance greatly increased the amounts of DDT available for more extensive coverage and made possible the inclusion of more villages in the operational area. Lack of adequate quantities of DDT previously limited spraying to selective spot applications within houses and also limited the number of houses to be sprayed in the selected villages. For the first time skilled DDT spraying became available for every house in each village.

An efficient spraying of all buildings at a dosage of 2 grams a square meter (214 milligrams a square foot) in each village in malaria control areas is being achieved. These buildings normally include stables, dwellings, mosques, shops, and village halls. The single

annual application is performed during a 6-week period in the spring. However, in the more tropical regions where there is no marked break in the mosquito-breeding season, two or more additional applications are required.

For the most part, the buildings in rural Turkey are constructed of mud and similar materials. More than 80 percent of the buildings have these porous and absorptive surfaces for which emulsions and solutions of DDT are not suited. Therefore, water-wettable suspensions of DDT have replaced these other formulations. Solutions and emulsions are used for spraying less absorptive surfaces for areas where the white residue of water-wettable DDT would be objectionable. The flat fan spray nozzles with delivery rates of 0.2 and 0.4 gallon a minute are standard equipment in all spray operations. The stainless steel tip nozzle, which is designed for delivery at 0.4 gallon a minute, has given better service with DDT suspensions than the brass tip nozzle because erosion does not enlarge the aperture so quickly.

DDT has been used in limited amounts since 1946 with no reported ill effects to humans since adequate precautions have been taken to protect food, utensils, and sprayer operators. In some provinces in 1952, DDT was believed to have contributed to a high mortality in silkworms. Silkworm culture is carried on inside homes, and spraying in the homes leads to obvious difficulties. Special instructions excluding the homes from spraying operations have thus far prevented a recurrence of damage claims.

General insect control to a high degree has



Indicating mark of DDT application.

been achieved during the past three seasons with chemicals. The spray program has been popular, more often for comfort and convenience than for malaria control. People outside the 12,600 villages under control have attempted various means to have their villages included in the program.



Water-wettable DDT is mixed for spraying in a Kurd village in eastern Turkey. Note goat-skin water bags.

In Turkey, as in all other parts of the world, houseflies have developed some tolerance to DDT. Though many claims of resistance can be attributed to localized operational inadequacies, the main fault lies in the fact that housefly control is unobtainable after a few years of DDT spraying and related chemicals, when such measures are not part of an integrated sanitation program which includes proper disposal of garbage and human wastes.

The reports of resistance in *A. sacharovi* from Greece caused some concern, but where efficient spray operations prevailed there were no credible parallels observed in Turkey. Most cases investigated revealed that DDT residues had been masked by smoke, greases, and the like, or that hard-to-reach surfaces had not been sprayed.

The existence of true resistance or modified behavior patterns due to irritant repellancy of DDT (9) was not established by biological tests during the period of American aid in malaria control.

Malaria in Turkey has been reduced to a fraction of its former incidence. As in many parts of the world, the extensive and intelligent

use of DDT in a residual spray operation has greatly accelerated the rate of decline.

The reduction in transmission has been impressive, but still there is danger of localized sporadic outbreaks so long as chronic carriers and capable vectors remain. The malaria control organization offers a nearly perfect setup for a rigid surveillance program in the years to come. Village visitations continue, with greater emphasis given to case finding. More effective treatment is in progress under a more rigid medical direction. With some villages becoming free of malaria, additional emphasis can be given to those which still have reported cases of the disease.

The conversion of the existing organization to one of general public health services is a logical sequence as malaria decreases in importance. The trend from specialized to general public health services is in the formative stage, with sanitarians gradually broadening their activities. Thus, the Turks, with characteristic energy and persistence, have all but conquered a disease which plagued their land long before their ancestors captured it.

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Mental Defectives and Epileptics in Public Institutions

There were more than twice as many first admissions as discharges from public institutions for the mentally defective in 1954, according to the National Institute of Mental Health, Public Health Service.

New cases numbered 12,485 or 8 per 100,000 population, while 5,815 patients were discharged and 1,026 readmitted. The average daily patient load for mental defectives and epileptics combined was 138,595, with 109,931 classed as mental defectives. The range of expenditures for patient care varied considerably among the States, but the average cost per patient-year was \$1,039. Of the 157,770 patients on the institution books at the end of the year, 139,977 were listed as in residence.

The item on page 162 of the February 1956 issue incorrectly applied the figures above to public mental hospitals.

The United States-Iraq Cooperative Health Program

By GLENN S. USHER, M.D., M.P.H.

THE objective of the United States program of public health assistance in Iraq is to help the Iraqi Government organize modern, efficient public health services in the 14 provinces (liwas) and the major cities of the country. Although this has been the objective of the program since its inception in 1952, it was only after 2½ years had elapsed that it was formalized into a 5-year plan. To achieve the objective, it was obvious that rather large numbers of public health personnel would have to be recruited and trained. It was the result of planning for this training that the 5-year plan evolved.

Background

Iraq was formerly known to the West as Mesopotamia, which means "the land of two rivers." The country depends upon the Tigris and Euphrates Rivers for irrigation and heavy commerce.

The northern part of the country is mountainous, but in the southern part there are large marshy areas. The western part of the country forms part of the Great Arabian Desert.

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Of the three main cities in the country—Basra, Baghdad, and Mosul—Basra is a port city near the Persian Gulf; Baghdad, the largest city, lies on the Tigris River in the mid-portion of the country; and Mosul is on the Tigris River in the north, away from the main lines of communication.

The climate in the central and southern areas is extremely hot in summer and mild in winter. North to Mosul and the mountains, the summer climate is less severe.

The economy of Iraq is based upon agriculture and oil resources. For the most part, agriculture is dependent upon irrigation. As a result of the slow gradient of most of the irrigated land the flow of water in irrigation ditches is sluggish. In addition, to prevent salting of the soil, drainage canals have been built to draw off the irrigation water. Such irrigation and drainage ditches provide conditions favorable for the growth of snails which serve as the intermediate host in the transmission of schistosomiasis. This disease threatens to become a serious detriment to public health unless adequate measures of prevention are incorporated in the government's plans for irrigation and drainage.

The population of Iraq, according to the 1947 census, is approximately 5 million; 700,000 live in Baghdad, 100,000 in Basra, and 150,000 in Mosul. An estimated 200,000 Bedouin nomads roam the desert region and the remainder live in small villages and other rural areas. The prevailing religion is Mohammedanism.

The government is a constitutional monarchy with an elected parliament and several ministries presided over by a prime minister. A distinctive feature of the Iraqi Government is the Ministry of Development, whose programs of economic growth are formulated by a Development Board with the Prime Minister serving as chairman. The objective of the Development Board is to use its portion of the oil revenues to develop the agricultural and industrial potential of the country in such a way as to assure a sound economy after the oil reserves are exhausted. Seventy percent of the substantial oil revenues are allotted to the Development Board to finance its economic plans. The remaining 30 percent are allotted to the Ministry of Finance for distribution to various ministries for the normal operations of the government and for social welfare, education, and health.

Health Conditions

Although it is known that health conditions in Iraq are not good, it is difficult to speak with precision because vital and morbidity statistics are very incompletely reported. The mortality rate is commonly estimated to be about 25 per 1,000 population and the infant mortality rate 250 per 1,000 live births.

Undoubtedly, the most prevalent diseases in the country are those which affect the intestinal tract: bacillary and amebic dysentery and worm infestation. Nutritional deficiencies are prevalent, but actual starvation is limited mostly to infants. Starvation of infants is prevalent and results from lack of knowledge about modern artificial feeding methods.

Although malaria is no longer endemic in Baghdad and the immediate vicinity, it is still a problem in the southern date- and rice-growing areas and in the northern mountains. Schistosomiasis is a serious problem in some localities and threatens to become more widespread unless appropriate precautions are taken in connection with the irrigation projects which are being planned by the Development Board.

Tuberculosis is moderately prevalent in Iraq, and trachoma causes much blindness, particularly in the villages. Endemic typhus fever occurs in Iraq, and epidemics of smallpox occur almost annually. Localized outbreaks of

diphtheria and meningococcus meningitis are sporadic. Hookworm infestation is prevalent in some areas. Bejel is widely distributed in some remote rural areas.

Health Facilities

Of about 900 registered physicians in Iraq, 70 are foreigners. Almost all of the Iraqi physicians are graduates of the Royal College of Medicine in Baghdad. Six years of basic medical education at the college is provided free of charge by the government. In return, the graduates are obligated for 4 years of governmental service, divided among the Royal Hospital, the military service, and general practice in rural areas.

There are fewer than 600 registered nurses. About 260 are graduates of 3-year training schools, and the remainder are graduates of 1-year training courses in small hospitals.

There are about 5,000 hospital beds in the country, or 1 per 1,000 population for the country as a whole. The major portion of the hospital beds are concentrated in the city of Baghdad. However, the capital city of each liwa has a general hospital and in some instances 1 or 2 specialized or military hospitals. Free medical care is provided in more than 90 percent of them. Nevertheless, most of the hospitals are old, poorly equipped, and understaffed. Laboratory facilities in almost all of the hospitals and dispensaries are inadequate for accurate confirmation of diagnoses.

Of the dispensaries, only a few are operated by physicians. The majority are operated by "health officials" who correspond roughly to male nurses in the United States, or by "dressers" who are men trained locally. Most of these dispensaries we would term first-aid stations. In some of the mountainous areas, mule-train dispensaries have been organized in an attempt to bring rudimentary medical care to the people.

In each of the 14 liwas (provinces), there is a central liwa hospital which, except in the Baghdad Liwa, is personally supervised by the chief medical officer who is administratively responsible to the governor of the liwa for all medical and public health activities within the liwa. The chief medical officer obtains his professional guidance, operating funds, and assign-



Foreign quarantine inspector at work. This service is under the direction of an American trained Iraqi physician.

ment of personnel from the Ministry of Health.

In the field of sanitation, the government, under the supervision of the Ministry of the Interior, is progressing rapidly in bringing clean water to its people. The major cities and most of the towns now have modern water treatment plants and distribution systems. However, in most of these cities and towns, personnel training and plant supervision have not yet progressed to the point where the water can be considered safe by Western standards. As a logical first step towards promoting safe water supplies for villages, the Development Board is conducting a survey of the ground waters of the country.

Less has been accomplished in developing sanitary disposal of sewage, but the government officials are acutely aware of the need and a bill has been introduced in Parliament which would

set up a commission on municipal drainage and sewerage design and construction. (The use of sanitary privies is almost unknown.)

Large numbers of villages depend for drinking purposes entirely upon irrigation water that is often highly contaminated. This water is obviously a serious health hazard.

With respect to the other aspects of public health and sanitation, the responsibility rests with the chief medical officers of the 14 liwas and the city health officers of the major cities. Such sanitation services are quite rudimentary.

Fellowship Program

As a first step in the United States assistance program, fellowships were awarded and training courses started on an empirical basis. Soon it became evident that it was not practical to plan a training program without a concept of the type of organization one was trying to build. Therefore, a proposed organization chart was designed, and soon a proposal was drafted for the training of the personnel to staff the organization. The organization chart and the training proposal were prepared by the Ministry of Health with the assistance of consultants from the United States Operations Mission, the World Health Organization, and the British Government.

The plan encompassed the training of many types of hospital personnel as well as public health and sanitation personnel. Realistic consideration to recruitment problems and possible sources of training have also been included in the plan, and detailed job descriptions have been prepared for all of the positions.

To date, 31 fellowships for health instruction in the United States have been granted as follows: public health administration (physicians), 7; hospital administration, 6; vital statistics, 3; sanitary engineering, 2; surgery, 2; pathology, 2; ophthalmology (4-month grant), 2; and 1 each in internal medicine, obstetrics, general hygiene, anatomy, ear-nose-throat, urology, and public health laboratory. Also the following 19 health fellowships have been granted for training at the American University of Beirut in Lebanon: public health nurses, 7; sanitarians, 4; laboratory technicians, 5; and hospital administrators, 3.



An American laboratory technician teaching a class of Iraqi students.

Trainees most difficult to recruit have been those for public health administration and public health nursing. Iraqi physicians do not consider positions in public health administration financially attractive. It is also difficult to recruit for public health nursing because few graduate nurses want to take the training and few are sufficiently proficient in the English language to benefit from courses offered by the United States. Proficiency in English is essential because there are no schools of public health nursing where the instruction is given in Arabic. The teaching in the public health school at the American University of Beirut is in English.

Nurse training at the Royal Hospital, the only governmentally recognized 3-year nursing school in the country, is conducted in Arabic.

The ministry is attempting to break these bottlenecks by providing better pay for full-time public health physicians and by establishing a new nursing school. Such a school will be established with our assistance in the near future. Instruction will be given in English in the new school, and eventually instruction in nursing will be in English instead of Arabic since

there is little professional Arabic literature in the field of nursing.

All Iraqi personnel who complete courses of training either under fellowships or in the co-operative projects described below are followed up to see that they are properly placed and that their newly acquired skills are fully utilized. In addition, the physicians who have studied public health administration meet regularly as a group to discuss Iraq's public health problems and to seek solutions to the difficulties they are encountering in applying the techniques they have learned.

In all training programs it is as important to provide appropriate orientation toward democratic public health objectives for administrative leaders as it is to train professional and semiprofessional workers to do the field work. Without sympathetic and intelligent administrative leadership, the field workers cannot be fully effective however well trained they are. Therefore, a policy has been adopted of providing grants to high ranking Iraqi public health officials to enable them to visit America for carefully planned and supervised tours of American institutions and for conferences with American leaders in various fields of public health and medical care.

Basra Demonstration Project

In addition to grants and fellowships, the program provides on-the-scene training through a variety of demonstration projects.

At Basra, near the Persian Gulf, the ministry is being assisted in establishing a public health demonstration and training project. The purpose of this project is to set up, in this one liwa, a public health organization like the one envisioned in the 5-year plan.

American personnel with Iraqi counterparts fill the positions of senior health officer, sanitary engineer, sanitarian, public health nurse, and health educator. An Iraqi epidemiologist also has been provided, and the ministry has assigned three Iraqi public health nurses who were trained under our fellowship program at the American University of Beirut.

Iraqi personnel are being trained, and as they become proficient in their duties the project activities will be expanded until they take in



A home visit by an Iraqi public health nurse of the Basra project.

the entire liwa. Instruction is being given to public health nurses, health visitors, sanitarians, and health educators. Also assistance is being given in connection with public health administration and modern public health techniques to the Iraqi physicians who are associated with the program. When the field activities are well established, this project will serve as a center for formal training and for supervised field experience for personnel to staff similar projects in other parts of Iraq.

Thus far, the activities of the project have been concentrated largely upon health education and the training of personnel. Ten health visitors and 12 sanitarians have been trained, and the health visitors have been engaged in supervised field work for a year. For example, in the one month of May 1955 the public health nursing and health visitors' section gave service to 8 clinic sessions and 34 school health sessions,

made 1,457 home visits, and gave 19 group talks.

One accomplishment of this project has been the demonstration that a citizens health committee can organize and function effectively in Iraq, a country which has been relatively unaware of this civic progress. These committees are composed entirely of Iraqi citizens who elect their own officers and conduct their own meetings. One citizens committee has been working for almost a year. Its work will be the base for an aggressive health education program. Additional committees are organizing with the full support and encouragement of the provincial governor, the mayor, and the chief medical officer.

The sanitary engineer assigned to the project is studying conditions under which a proposed drainage and sewerage system for the city of Basra will be installed.

It is planned that there will be a central

health center in the city of Basra which, in addition to providing clinical health services for the people of the immediate vicinity, will provide offices for the liwa health personnel. Branch health centers will be located in the various communities of the liwa in such a way that they will be accessible to the entire population.

Environmental Sanitation Project

An American sanitary engineer has been assigned to the Ministry of Health in order to give substance to its department of sanitation.

Initially, this engineer devoted the greater portion of his time to the city of Baghdad. He supervised and trained the city's sanitarians and revised and strengthened the city's program of sanitation of public eating places. A food handlers' school was established, and instruction has been given to 850 food handlers. The engineer introduced an educational approach to restaurant inspections. In addition, he provided consultation on many aspects of the city's sanitation problems. City authorities were persuaded to operate a sanitary landfill for garbage disposal. Improved design and supervision were introduced in the construction of cesspools and septic tanks by private contractors. Practices at milk pasteurization plants were improved.

Baghdad has now acquired a well-trained Iraqi sanitary engineer who has assumed these responsibilities although our sanitary engineer continues to give guidance and technical advice. Outside of Baghdad, requests for his assistance thus far have been mostly in connection with drainage and sewage disposal problems. Plans for expansion of his activities are under consideration.

Hospital Facilities Project

The Iraqi Government intends to launch a hospital and health center construction program which will cost \$20 or \$30 million or possibly more. Since Iraq lacks the specialized personnel required to plan an efficient hospital system or to design modern hospitals, a hospital architect and a hospital administrator have been assigned to the Ministry of Health by

the United States Operations Mission. At present, they are engaged in functional studies, preliminary sketches, and cost estimates for a new Royal Medical Center (referred to locally as Medical Town) to replace the present Royal Hospital. This will include an 850-bed government hospital, a 150-bed private hospital, a central building for the Royal Medical College, and a nursing school. It is estimated that the project will cost about \$12 million.

The role of the American team is (a) to make preliminary functional studies of the proposed buildings; (b) to represent "the client" (the Ministry of Health) in negotiations of contracts with architectural firms for the production of working drawings and specifications and the supervision of construction; and (c) to represent the client in relation to the smaller projects which are designed and constructed by Iraq's Department of Public Works.

The hospital administrator assigned to the project is directly concerned with the portion of the ministry's 5-year plan that deals with the training of hospital personnel. Of special concern to him are the Iraqi personnel who have completed training in hospital administration either in the United States or at the university in Beirut. He helps with the placement of these personnel in appropriate positions and keeps in close contact with them during the period of adjustment to their new duties. It is expected that these former trainees, under the guidance of the American hospital administrator, will spearhead the improvement of hospital administration practice in Iraq.

Village Life Improvement

One program of the United States mission cuts across the various technical specialties and aims to bring about improvement in all aspects of the living standards in the villages of Iraq. Public health has an important role with respect to improvement of water supply and village sanitation, control of disease vectors, and home hygiene services.

This program is one of several types which are referred to as "impact programs." Its objective is to carry some of the simple benefits of modern technology more directly to the villagers than can usually be done through the nor-

mal operations of government agencies. Iraqi personnel are trained and then assigned to live in the villages and show the inhabitants how to improve their living conditions.

The Iraqi "rural affairs officers," who are being trained under this program, are known as multiple purpose workers. Sanitation and hygiene are important subjects in their training course, which also includes some simple methods of improving agricultural practices, homemaking, child care, and road building.

Two other projects are in operation at present. The first is the maternal and child health demonstration and training project, which has been reported in detail in *Children*, volume 2, March-April, 1955. The second project, recently instigated with American assistance, is a school for laboratory technicians.

Comments

The region which is now Iraq has been the abode of some of the world's oldest and proudest civilizations. It was the breadbasket of the Babylonian and the Moslem Empires. Its soil has provided a prosperous living for populations estimated as high as 40 million.

However, the Mongol invasions decimated the population and destroyed the elaborate irrigation system upon which the livelihood of the people depended. These invasions struck the civilization of the area with what Toynbee would call an "overwhelming challenge." The following four centuries (since 1517), under Ottoman rule, drained the people of their initiative and ambition and instilled in them a deep, abiding distrust of centralized government. In response, they devised a form of subsistence living which made it possible for them to survive under the most adverse conditions.

Since Iraq's liberation in the First World War, the country has, with British assistance,

made much progress in reviving the art of self-government (parliamentary), but much remains to be done to improve the standards of living of the common people. In recent years the new revenues derived from the exploitation of the country's oil resources give hope of a rapid acceleration in the achievement of this objective.

The United States offer of the services of experienced American personnel aims to help rehabilitate the nation's economy and assist in bringing better living conditions to the people. The Government of Iraq has welcomed this assistance and has sincerely tried to carry out its part of the cooperative agreements. That it has not been entirely successful in this is due to various factors which include: (a) its inadequate fiscal and personnel systems, which impose formidable administrative barriers; (b) the narrow base of the country's educational system, restricting opportunity, especially for girls, with the resultant scarcity of qualified candidates for training; (c) frequent and numerous cabinet changes in recent years; and (d) the great flood of the spring of 1954.

Despite these handicaps substantial progress has been made with the public health program. The public health program has been chiefly a "pump-priming" operation to encourage the granting of appropriate emphasis to preventive medicine and sanitation in the country's economic plans. The country has sufficient resources to permit it to support a completely modern medical and public health establishment. The problem has been to avoid allowing the public demand for curative medical facilities to overemphasize personal medical care at the expense of public health facilities needed.

Progress to date has been gratifying, and for the future there is justification for increased optimism as confidence in, and respect for, public health services take hold.



technical publications

The Engineer in the U. S. Public Health Service

Public Health Service Publication No. 455. 1955. 20 pages.

This illustrated brochure for the recruitment of sanitary engineers describes the wide variety of activities of the commissioned engineer officer in the Public Health Service. Qualified sanitary engineers are invited to join the Service and share in its 150-year-old tradition and progress.

Discussed are the many opportunities the Service offers in the field of environmental sanitation—water supply, waste disposal, milk and food, vector control, and the challenging new fields of air pollution and radiological health.

The various facilities including the Robert A. Taft Sanitary Engineering Center, the largest research institution in the field, are depicted. Opportunities for service overseas with the United States health missions are explained.

The booklet also delineates the role of the engineer members of the Public Health Service Commissioned Reserve in meeting emergency national health problems.

Biological Products, Revised, 1955

Public Health Service Publication No. 50. 1955. 48 pages. 20 cents.

Superseding Miscellaneous Publication No. 39, this publication lists establishments holding licenses for the preparation and sale of viruses, serums, toxins and analogous prod-

ucts, and the trivalent organic arsenic compounds.

The licenses granted establishments for the products specified do not imply an endorsement of the preparations. A licensed establishment is inspected regularly for personnel technical ability and sanitary condition of premises. In addition, manufacturing methods must be adjudged safe, and the establishment must meet requirements, specified by the Division of Biologics Standards of the National Institutes of Health, designed to insure the continued safety, purity, and potency of products.

Sources of Morbidity Data, Listing Number 3. 1955.

Public Health Service Publication No. 459. 99 pages.

The third listing of projects in the files of the Clearinghouse on Current Morbidity Statistics Projects contains descriptions of 145 projects, supplementing the 332 described in listings No. 1 and 2 (Public Health Service Publications 332 and 399).

Listing No. 3 has a section of supplementary notes on projects in listings No. 1 and 2, that represent a systematic followup on all projects in the two listings that were in progress when their descriptions were received by the clearinghouse.

In listing No. 3 there is an index by type of data collection, also an alphabetical list of principal investigators, and, for the first time, an index of organizations and institutions participating in the projects.

Because the listings of the clearinghouse are published primarily for the use of actual and potential contributors, the number of bound copies available for other distribution is limited. Tear sheets for all projects are on file, however, and these will be mailed free of charge to persons inquiring about studies of a particular type.

NIDR Current Clinical Studies and Patient Referral Procedures at the Clinical Center

Public Health Service Publication No. 456. 1955. 8 pages.

Described in this pamphlet are current clinical studies of the National Institute of Dental Research and the types of patients desired for participation in these studies.

It is intended as an aid to dentists and to others in dental schools, clinics, and health services who wish to refer patients to the institute for study and treatment at the Clinical Center in Bethesda, Md. Also explained is the procedure for referral of patients and the requirements for admission to the Clinical Center.

This section carries announcements of all new Public Health Service publications and of selected new publications on health topics prepared by other Federal Government agencies.

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